Electric Reliability Council of Texas (ERCOT)

Self-Evaluation Report

A Report to the
Texas Sunset Advisory Commission

September 2021

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ERCOT Self-Evaluation Report

I. Agency Contact Information

A. Please fill in the following chart.

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II. Key Functions and Performance

A. Provide an overview of your agency's mission, objectives, and key functions

ERCOT's Mission, Objectives, and Key Functions

The Electric Reliability Council of Texas (ERCOT) is a 501(c)(4) nonprofit corporation governed by a board of directors and subject to the oversight of the Legislature and the Public Utility Commission of Texas (PUCT). ERCOT oversees the reliable and safe transmission of electricity over the ERCOT power grid and operates open and non-discriminatory electric markets that serve nearly all of Texas. ERCOT manages the flow of electric power over the bulk electric system through which more than 26 million Texans, representing approximately 90% of the State's electric load (i.e., demand for power), receive power.

2021 ERCOT REGION

Before 1999, vertically integrated, investor-owned utilities, as well as municipally owned utilities, and electric cooperatives, owned or operated all of the assets – from generation units, transmission facilities, distribution facilities, to customer meters and customer-service systems – to provide electric service to the end-use customers in the entities' designated service areas. Vertically-integrated utilities, municipally owned utilities, and electric cooperatives also each had the exclusive right to sell electricity to the customers in their respective service areas. In 1995, in a first step towards the ERCOT markets of today, the Legislature opened the wholesale electric market in ERCOT to competition and required all entities owning transmission lines to provide open, non-discriminatory access to transfer wholesale power. Thereafter, in 1999, the Legislature restructured the majority of the Texas electric market by requiring most of the investor-owned utilities to separate into different entities that would provide solely generation, transmission and/or distribution, or retail services. This is often referred to as "unbundling." This restructuring resulted in the continued regulation of investor-owned transmission and distribution utilities and introduced competition into the sale of electricity to retail customers. Retail competition has empowered the retail customers of the former vertically-integrated utilities to choose from whom they buy electricity. Electric cooperatives and municipally owned utilities were granted the ability to decide whether to provide customer choice in their service areas, as well. Almost all electric cooperatives and municipally owned utilities have elected to maintain their exclusive right to provide retail service in their areas, and they are often referred to as the "Non-Opt-In Entities" or NOIEs.

As part of this restructuring of the electric industry, the Legislature assigned ERCOT four primary responsibilities as the PUCT-certified independent organization for the ERCOT region:

- Ensure access to the transmission and distribution systems for all buyers and sellers of electricity on nondiscriminatory terms;

- Ensure the reliability and adequacy of the regional electrical network;

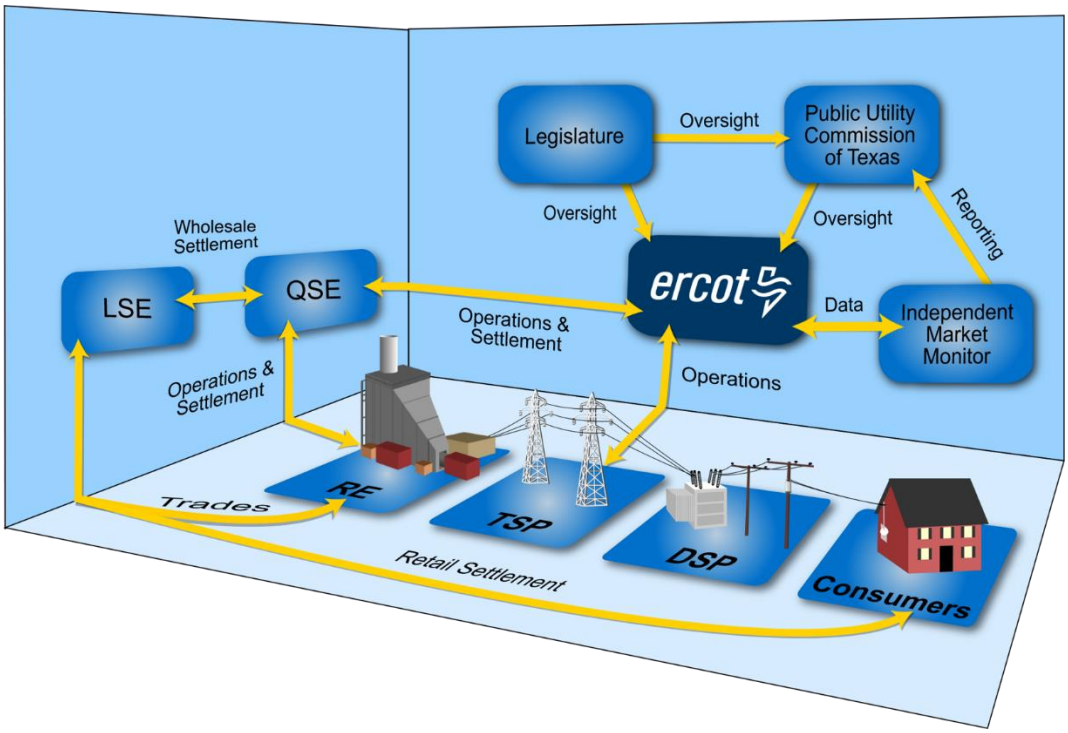
- Ensure that information relating to a customer's choice of retail electric provider is conveyed in a timely manner to the persons who need that information; and

- Ensure that electricity production and delivery are accurately accounted for among the generators and wholesale buyers and sellers in the region.

In sum, ERCOT is responsible for (1) providing open access to transmission, (2) maintaining system reliability, (3) ensuring retail choice, and (4) facilitating a competitive wholesale market.

ERCOT schedules and dispatches power on a grid that connects more than 46,500 miles of transmission lines and more than 710 generation units, as the Independent System Operator (ISO) for the region. ERCOT also administers customer switching (i.e., changing electric providers) for nearly 8 million premises in competitive-choice areas.

In addition to overseeing the electric grid, ERCOT manages financial settlement for the competitive wholesale bulk-power market. More than 1,800 active Market Participants generate, move, buy, sell, or use wholesale electricity in the ERCOT wholesale markets. These Market Participants include power generators, transmission and distribution utilities, retail electric providers, power traders, electric cooperatives, and municipally owned utilities. An overview of the ERCOT market is pictured below and discussed in greater detail herein.



Below is a list of the major ERCOT strategies and corresponding programs that are detailed in this Self-Evaluation Report:

Grid Operations:

- System Operations – Control Center
- System Operations – Training
- Operations Engineering & Support

Grid System Planning:

- Transmission Operations Planning
- Regional Planning
- Transmission Planning Assessment
- Resource Adequacy

Forecasting and Ancillary Services:

- Load Forecast & Analysis
- Operations Analysis

Grid Coordination:

- Resource Integration
- Engineer Development Program
- Grid Coordination Support & Development
- Renewable Energy Credit Program Administration

Commercial Operations:

- Market Rules & Stakeholder Support
- Settlement Metering
- Data Loading & Aggregation
- Settlement Operations
- Settlement Services
- Retail Operations
- Market Design
- Market Validation
- Congestion Revenue Rights
- Day-Ahead Market
- Demand Integration
- Credit Risk Management
- Passport Program

Client Services:

- Client Services
- Market Support Services
- Market Training

Critical Infrastructure Security:

- Cybersecurity

Compliance:

- Critical Infrastructure Protection (CIP) & Corporate Compliance
- Operations and Planning Compliance

B. Do your key functions continue to serve a clear and ongoing objective? Explain why each of these functions is still needed.

Each of ERCOT's key functions continue to serve a clear and ongoing objective.

- **Ensuring Open Access to Transmission and Distribution Systems:** Providing nondiscriminatory access to the grid's transmission and distributions systems is necessary for an efficient market, as Market Participants must be able to compete and innovate without concern that other participants may receive favorable treatment.

- **Maintaining System Reliability:** Ensuring reliable electrical power is critical to economic stability and to each Texan's health and safety. Businesses depend on the reliable delivery of electricity to support their operations, and individuals depend on electric power reliability to provide power for their daily needs. Essential services providers—e.g., hospitals, police departments, water and sewer utilities, fire departments—also depend on reliable power in order to fulfill their duties and keep Texans safe.

- **Enabling Retail Choice:** A key motivation in restructuring the Texas electric market was to create customer choice—i.e., to allow Texans to choose among competitive retail electric providers, rather than having to buy electricity at the rates set by monopolistic utilities. ERCOT's role in timely and accurately relating customer-choice information to service providers is critical to enabling this retail choice. ERCOT's role also involves the prompt and accurate relay of meter data to service providers so that end-use customers are correctly billed.

- **Operating Fair and Competitive Wholesale Markets:** Accurately and timely accounting for electricity production and delivery among generators and wholesale buyers and sellers is central to the success of the ERCOT wholesale markets, providing market-based, competitive prices to Texas customers.

C. What, if any, functions does your agency perform that are no longer serving a clear and ongoing purpose? Which agency functions could be eliminated?

All functions currently performed by ERCOT are necessary to carry out the objectives outlined above and, as such, there are no functions that can be eliminated without significantly impacting the reliability of the ERCOT grid and stability of the ERCOT market.

D. Does your agency's enabling law continue to correctly reflect your mission, objectives, and approach to performing your functions?

ERCOT's enabling statute continues to correctly reflect and support ERCOT's mission, objectives, and key functions.

E. Have you previously recommended changes to the Legislature to improve your agency's operations? If so, briefly explain the recommended changes, whether or not they were adopted, and if adopted, when.

ERCOT has never recommended changes directly to the Legislature. Because the PUCT comprehensively oversees ERCOT's operations, ERCOT raises any potential legislative recommendations with the PUCT, and the PUCT determines whether to include those in its own recommendations to the Legislature. The PUCT's recommendations are included in its biennial reports to the Legislature, which are submitted in January of every odd-numbered year. The

PUCT's most recent biennial report—which does not include any ERCOT legislative recommendations—is available at this link.

Before 2021, the PUCT's biennial reports were styled as "Scope of Competition" reports. The PUCT's 2019 Scope of Competition report is available at this link, and an archive of Scope of Competition reports from 2017 and before is available at this link.

F. Do any of your agency's functions overlap or duplicate those of another local, state, or federal agency? Explain if, and why, each of your key functions is most appropriately placed within your agency. How do you ensure against duplication with other related agencies?

ERCOT's functions do not overlap or duplicate those of any other federal, state, or local agency.

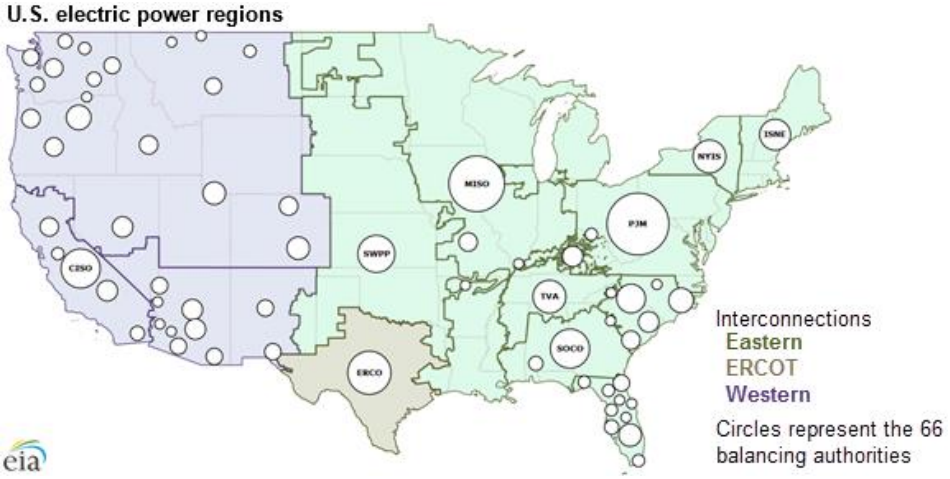
From a federal standpoint, the ERCOT region is the only wholly intrastate electric grid; it has limited asynchronous, direct current ties to out-of-state electric generation. ERCOT is subject to federal electric reliability standards, but, because of its intrastate nature, ERCOT is largely exempt from federal regulation of use of the ERCOT transmission system and markets design. Regulation of ERCOT instead comes almost exclusively from the PUCT and the Legislature.

As the sole operator of the Texas Interconnection, ERCOT's functions are inherently unique and do not fall within the purview of any other state or local agency. Although the PUCT oversees virtually all aspects of ERCOT's operations, ERCOT is the only organization carrying out the functions necessary to operate the grid and manage the competitive electric markets in this interconnection.

G. In general, how do other states carry out similar functions?

In the United States, there are three separate power grids, or "interconnections," which are electrically independent from each other except for a few direct current (DC) ties. Those three interconnections are:

- The Eastern Interconnection, covering the eastern two-thirds of the U.S. from the Great Plains states eastward to the Atlantic coast;
- The Western Interconnection, covering the western third of the U.S from the area west of the Rocky Mountains and the Great Plains (excluding most areas of Texas) to the Pacific coast; and
- ERCOT, covering nearly all of the State of Texas.

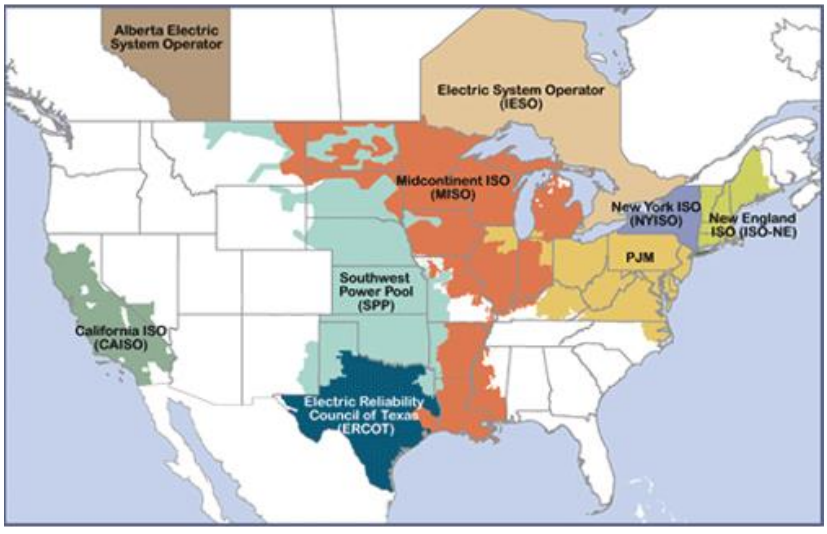


Source: U.S. Energy Information Administration
(Please note: this map does not reflect the recent integration of the Lubbock area into the ERCOT region)

The Eastern and Western interconnections are made up of a vast network of local electric grids, with regional balancing authorities serving to manage grid operations. A balancing authority ensures, in real-time, that electric system demand and supply are balanced to maintain the safe and reliable operation of the system. ERCOT is unique in that the interconnection and balancing authority are the same entity and physical system.

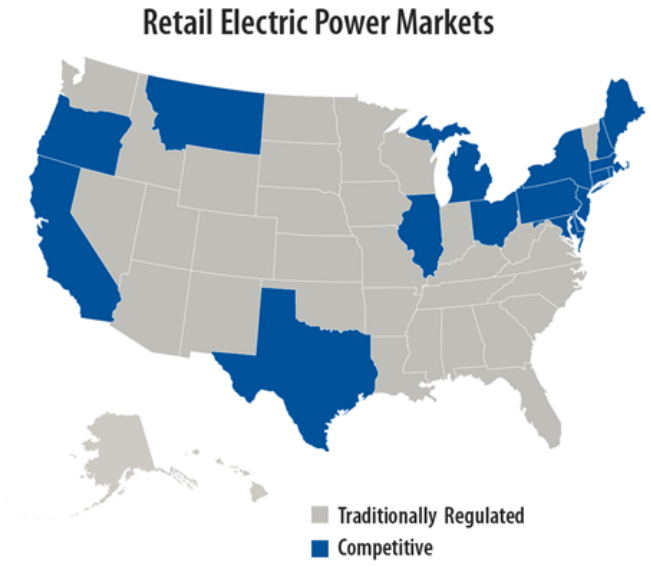
Each of these power regions also has wholesale and retail market components. Wholesale markets involve the sale of electricity among Market Participants (e.g., generators, retail energy suppliers) before it is eventually sold to customers. Retail markets involve the sale of electricity to customers. Wholesale and retail electric markets can be traditionally regulated or competitive markets.

As pictured below, approximately two-thirds of the U.S. is comprised of competitive wholesale electric markets, run by Regional Transmission Organizations (RTOs) or Independent System Operators (ISOs) like ERCOT. The remaining one-third constitutes traditionally regulated wholesale markets. These markets are run by vertically integrated utilities that own the generation, transmission, distribution, and retail sales systems, and are responsible for the entire flow of electricity to customers.



Source: Federal Energy Regulatory Commission
(Please note: this map does not reflect the recent integration of the Lubbock area into the ERCOT region)

Whether a retail market is competitive is determined by each state. In a traditionally regulated market, customers cannot choose from whom they get their power and must purchase electricity from the monopoly utility in their area. Competitive markets like ERCOT, by contrast, allow customers to choose between competitive electric retail suppliers, and have led the way on developing renewable generation. The spread of competitive and traditional retail markets is pictured below:



Source: U.S. Environmental Protection Agency

Not all markets are wholly regulated or competitive, however. California, for example, is a partially restructured market that limits retail choice by capping the amount of load available to be served by competitive retail providers; as a result, a majority of California customers are still being serviced by vertically integrated utilities. In contrast, ERCOT is fully restructured, offering competitive wholesale prices throughout its footprint and retail choice in areas that were previously served by large investor-owned utilities.

H. What key obstacles impair your agency's ability to achieve its objectives?

The modern electric grid is currently undergoing a period of rapid change. Numerous reports from the North American Electric Reliability Corporation (NERC), the federal regulatory authority for grid reliability and security, and industry studies indicate that the next 10 to 15 years will include more operational and infrastructure change than the U.S. has seen in the last several decades. These modernizations include the:

- continued integration of even larger amounts of intermittent resources (*e.g.*, wind and solar) at the transmission-voltage level;
- emergence of megawatt-sized battery energy storage technologies;
- a greater presence of smaller-scale generation resources on the distribution system;
- increasing use of advanced metering;

- adoption of smart grid controls for loads;
- continued adoption of rooftop solar power; and
- a trend of retirements for many coal and natural gas fired units.

These changes present several challenges for ERCOT as Texas's Independent System Operator:

Talent Attraction and Retention: Staff attraction and retention are a continuing challenge for ERCOT. Top talent, after being trained within ERCOT, are often hired away by Market Participants who offer salaries that ERCOT cannot match. Replacing a retiring population of workers with industry knowledge also continues to be a challenge.

Given the rapidly changing electric industry and ERCOT's critical duties, ERCOT needs access to the best engineering, market design, financial, governance, legal, and IT talent available. ERCOT is able to provide its staff with interesting, challenging work that benefits all Texans, and the nature of that work compensates to some extent for lower compensation than those offered by Market Participants. However, ERCOT's compensation structure must still be competitive for ERCOT to retain its top talent. To mitigate this issue, ERCOT has focused on internal training and creating a pool of employees who can gain experience and be promoted from within. *See infra*, Engineer Development Program.

Differing Regulatory Objectives: Federal and state policymaking bodies may have different goals in the ever-shifting regulatory environment, which affect ERCOT actions and operations. ERCOT needs clear direction from those who oversee ERCOT on reliability expectations, market design, and any limits on its operations that may affect its ability to meet its objectives.

Management of a Rapidly Changing Resource Mix: A significant learning curve exists as ERCOT manages increasing amounts of intermittent resources, new technologies (such as large-scale battery energy storage), and resources located in lower voltage circuits (*e.g.*, Distributed Energy Resources) that have not historically been modeled or controlled by ERCOT. Managing these new resources often requires ERCOT to develop new tools and requires Market Participants to provide additional data or incur other costs. In this respect, achieving overall objectives is difficult unless Market Participants provide needed transparency and cooperation.

Funding Sources: Funding remains a key challenge at ERCOT. By statute, ERCOT is funded by a PUCT-established fee (the system administration fee, discussed below) upon which 97% of ERCOT's operating revenue is generated. In setting the fee, the PUCT must balance ERCOT's operational needs—including the substantial cost of owning, maintaining, and upgrading the hardware and software systems needed to run the grid, and the costs of implementing changes demanded by a rapidly evolving grid—against the burden of the fee on Market Participants and, indirectly, retail customers. There is a consistent pressure to keep these fees low, which in some cases, requires ERCOT to defer system upgrades that would ultimately bring efficiencies in excess of their cost.

Software development issues: Almost every operational or market change requires ERCOT or its vendors to make customized software changes; usually, both. Modification of this complex software makes projects more costly and time-consuming.

I. Discuss any changes that could impact your agency's key functions in the near future (e.g., changes in federal law or outstanding court cases).

A number of court cases have been brought against ERCOT arising out of the February 2021 extreme winter weather event. These cases can be categorized generally as: (1) lawsuits by individuals alleging damages as a result of the extreme winter weather event; and (2) lawsuits by Market Participants concerning the wholesale prices charged to Market Participants during the period of the extreme winter weather event. ERCOT does not believe that the outcome of this litigation will affect its key functions.

Similarly, ERCOT does not believe there is any pending federal legislation that will change its key functions, although new reliability standards promulgated by the Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC) may require modifications to ERCOT processes, systems, and training.

In late August 2021, FERC approved NERC's proposed Reliability Standards IRO-010 and TOP-003. Generally, these new standards require ERCOT, in its roles as a NERC-registered Reliability Coordinator, Balancing Authority, and Transmission Operator, to modify its data specifications to require operators of generators to notify ERCOT of (1) operating limitations due to various cold weather–related impacts and (2) minimum generating unit operating temperatures. These will not be material changes to ERCOT operations; ERCOT already requires all generator operators to notify ERCOT of operating limitations, and it already requires operators of certain generator types (such as wind units) to provide data on minimum operating temperatures. The new NERC Reliability Standard revisions were approved in FERC Docket No. RD21-5. The revisions are described in FERC's order of approval, which is available at this this link by entering docket number RD21-5 and pressing the search button.

Additionally, FERC, NERC, and the Texas Reliability Entity are conducting a joint inquiry and investigations of the February 2021 extreme winter weather event. In this inquiry, the federal entities are working with states; regional entities, including ERCOT; utilities; and other Market Participants to identify problems with the performance of the bulk-power system. Additionally, solutions for addressing those issues may be identified. A report from the federal entities is anticipated to be released before the end of 2021.

J. Aside from additional staff or funding, what are your agency's biggest opportunities for improvement in the future?

- ERCOT is constantly evolving in order to enhance grid reliability and to facilitate a market capable of responding to market pressures and opportunities while still maintaining reliability. Marrying the reliability needs of the grid with market incentives requires continual development.

- ERCOT's focus on smart grid initiatives, such as advanced metering and increased demand response technology, will benefit Texas customers by providing increased control over their electric usage and helping reduce demand during tight conditions.

- As ERCOT and Texas continue to be national leaders in the integration of renewable resources, the State will increasingly benefit from these cleaner energy sources. That said, balancing the need for continued integration of renewable resources while promoting grid reliability remains an ongoing challenge.

- The incorporation of battery energy storage into the grid, the market process, and ERCOT's grid controlling systems will maximize the use of intermittent resources. However,

incorporating large amounts of battery energy storage will require improvement in training, systems, and analysis.

- The incorporation of small generation at lower distribution voltage (less than 60 KV) levels into the grid, the market process, and ERCOT's grid controlling systems will improve reliability and provide Texas customers with more flexibility in supplying their own power. Adding large amounts of small generation into the distribution system will require cooperation from Transmission Services Providers and necessitates improvements in ERCOT's training, systems, and analysis.

- ERCOT's ability to forecast future grid conditions will become an increasingly important function. In particular, the ability to accurately forecast the effect that weather has on wind and solar generation and system load will continue to be a focus for ERCOT operations.

- Pricing that reflects the reliability needs of the market (often called Locational Marginal Prices, or LMPs) needs to extend to new energy sources. Without consistent pricing across the market, an asymmetric market design will result.

- As the facilities that interconnect to the ERCOT grid continue to increase in amount, diversity, and complexity, incorporating artificial intelligence or machine learning into ERCOT processes and systems may assist with the holistic evaluation of ERCOT data.

- Furthermore, in response to the February 2021 extreme winter weather event, and consistent with Legislative and regulatory direction, ERCOT is engaged in making substantial changes to its operations. Those changes are organized and outlined under the five topics below.

1) **Grid Operations:** ERCOT is managing the grid more conservatively than ever before, including:
   - increasing operating reserves to ensure there is a healthy cushion between generation supply and customer demand at all times;
   - bringing more generation online sooner if it is needed for grid reliability;
   - purchasing even more reserve power on days when the weather forecast is uncertain; and
   - bolstering reporting requirements for generators to ensure ERCOT has accurate data on generation capacity and availability.

2) **Preparation:** ERCOT is helping prepare the grid for future extreme weather events by:
   - assisting in the PUCT's development of clearly defined reliability standards for generation and transmission owners;
   - performing winter weatherization inspections to ensure generation owners are prepared to provide power this winter and during weather emergencies;
   - working towards the issuance of financial penalties for non-compliance; and
   - engaging in more robust planning and oversight of controlled outages on the ERCOT grid.

3) **Transparency:** ERCOT is providing more information in a more accessible manner to increase accountability, including by publishing unplanned outage data on ERCOT.com three days after an operating day. This is a change from the prior requirement to post such data 60 days after an operating day.

4) **Management:** New PUCT and ERCOT leadership are:
   - restructuring the ERCOT Board, as directed in Senate Bill 2; and

- working towards the securitization of costs incurred by the market in connection with the February 2021 extreme winter weather event.

5) **Communication:** In an effort to more clearly communicate with the public and enhance coordination within the energy industries, ERCOT is:
   - communicating with less jargon to appeal to the general public;
   - engaged in greater collaboration with the PUCT and the Railroad Commission of Texas;
   - providing a new ERCOT.com home page and new issue-specific pages on ERCOT's website;
   - participating in establishing the statewide outage emergency alert system;
   - assisting in the formalization of the Texas Energy Reliability Council charged with enhancing coordination between ERCOT, PUC, and the electric and natural gas industries.

More information regarding changes being made at ERCOT are provided in ERCOT's Roadmap to Improving Grid Reliability. ERCOT anticipates other modifications to its operations within the next year as leadership, including a new CEO and board members, determine appropriate next steps in consultation with State leadership.

K. Overall, how does the agency measure its effectiveness in carrying out its objectives?

Annually, the ERCOT executive leadership team develops, and the ERCOT Board of Directors reviews and approves, specific key performance indicators and corresponding target metrics to drive performance of the organization. The indicators, along with their target metrics, are outlined as the annual ERCOT Key Performance Indicators (KPIs). These KPIs are set annually, reviewed on a quarterly basis, and used to measure the successful performance of the ERCOT organization.

ERCOT Key Performance Indicators — Fiscal Year 2020

Key Performance Measures	KPI ID	Calculation (if applicable)	FY 2020 Target	FY 2020 Actual Performance	FY 2020 % of Annual Target
Grid Security Management: Control Performance Standard 1 (CPS1) frequency control performance (rolling 12-month CPS1 score).	RG1	(N/A)	> 140	All scores greater than 150	Pass
Grid Security Management: Interconnection Reliability Operating Limit (IROL) exceedance limitations.	RG2	(N/A)	None longer than 20 minutes	No IROL exceedances longer than 10 minutes.	Pass
Outage Coordination/Planning: Outage Coordination performance: requests approved or denied within timeline and with mitigation plans developed if required.	RG3	(N/A)	97%	99.73%	Pass
Forecasting: Operations Load Forecast performance - Mean Average Percent Error (MAPE): monthly average day ahead load forecasts used for DRUC MAPE.	RG4	(N/A)	All less than 4.0%	2.63%	Pass

Key Performance Measures	KPI ID	Calculation (if applicable)	FY 2020 Target	FY 2020 Actual Performance	FY 2020 % of Annual Target
Forecasting: Wind forecast performance - MAPE based on installed wind capacity: monthly average day ahead wind forecasts used for DRUC MAPE.	RG5	(N/A)	All less than 10%	All less than 8%	Pass
Forecasting: Solar forecast performance - MAPE based on installed solar capacity: monthly average day ahead solar forecasts used for DRUC MAPE.	RG6	(N/A)	All less than 15%	All less than 10%	Pass
Compliance Monitoring & Reporting: Achieve compliance with SOC controls	RG8	(N/A)	No exceptions found in SOC audit	No exceptions found in SOC audit	Pass
IT Application Services: Energy Management System Tier 1 Aggregate Availability	RG9	(N/A)	All Tier 1 systems meet or exceed defined SLAs (99.90%)	100%	Pass
IT Application Services: Energy Management System Tier 2 Aggregate Availability	RG10	(N/A)	Achieve 99.9% availability for 10 of 11 Tier 2 systems	100%	Pass
IT Application Services: Security Constrained Economic Dispatch (SCED) Availability	RG11	(N/A)	99.95%	100%	Pass
IT Application Services: Security Constrained Economic Dispatch (SCED) number of unplanned outages greater than 30 consecutive minutes (per quarter)	RG12	(N/A)	Zero	Zero	Pass
IT Application Services: Outage Scheduler Availability	RG13	(N/A)	99%	100%	Pass
IT Application Services: Network Model Management System (NMMS) Availability	RG14	(N/A)	99%	100%	Pass
Bidding, Scheduling, and Pricing: Day-Ahead Market quality of solution as measured with price corrections: percent of hourly prices requiring DAM price correction	EM1	(N/A)	<3%	4.62%	Fail

Key Performance Measures	KPI ID	Calculation (if applicable)	FY 2020 Target	FY 2020 Actual Performance	FY 2020 % of Annual Target
Bidding, Scheduling, and Pricing: SCED solution is solved and posted: percent of 15-minute Settlement Interval prices where price corrections are performed. This measure includes corrections from routine work (e.g., database loads and site failover)	EM2	(N/A)	<1%	0.03%	Pass
Settlement & Billing: Achieve timely settlements per Protocol defined timelines	EM3	(N/A)	99%	100%	Pass
Settlement & Billing: Perform accurate settlements as measured by the percent of statements/invoices that do not require a correction as a result of an error in the settlement and billing systems or processes	EM4	(N/A)	98%	99.9%	Pass
Market Credit: Credit reports are correct and posted in a timely manner	EM5	(N/A)	98%	98.81%	Pass
Market Information: Wholesale extracts available per Protocol timelines	EM6	(N/A)	98%	98.96%	Pass
IT Application Services: Congestion Revenue Rights (CRR) Availability	EM7	(N/A)	99%	100%	Pass
IT Application Services: Market Management System Aggregate Availability	EM8	(N/A)	99%	100%	Pass
Customer Switching / Registry: Conduct retail transaction processing per Protocol timelines	OARC1	(N/A)	98%	99.88%	Pass
Customer Switching / Registry: End use customer switch notifications processed per PUCT rules	OARC2	(N/A)	99%	100%	Pass
Market Information: Retail extracts available per Protocol timelines	OARC3	(N/A)	99.9%	100%	Pass
IT Application Services: Retail Processing Availability - Business Hours	OARC4	(N/A)	99.9%	99.95%	Pass
IT Application Services: Market Management System Aggregate Availability	OARC5	(N/A)	99%	99.5%	Pass
Finance: Manage spending to be equal to or less than the board-approved expenditure budget	OSM1	(N/A)	Between 0-5% favorable variance	-1.0%	Fail

Key Performance Measures	KPI ID	Calculation (if applicable)	FY 2020 Target	FY 2020 Actual Performance	FY 2020 % of Annual Target
Security: Maintain ERCOT ISO's security posture against cyber security threats as defined in the Security Incident Response Plan	OSM2	(N/A)	Zero externally reportable cyber security incidents	Zero externally reportable cyber security incidents	Pass
Security: Maintain ERCOT ISO's security posture against physical security threats as defined in the Security Incident Response Plan	OSM3	(N/A)	Zero externally reportable physical security incidents	Zero externally reportable physical security incidents	Pass

ERCOT's full KPI performance reports are included alongside its Annual Report filed with the PUCT. Those reports may be found at the links below:

2019 Annual Report to the PUCT

2020 Annual Report to the PUCT

L. Please list all key datasets your agency maintains and briefly explain why the agency collects them and what the data is used for.

ERCOT manages a network of integrated data systems to provide reliable electric power in the ERCOT region. As illustrated below, ERCOT is comprised of operations, planning, markets, settlement, retail, and other functional lines of business, all of which maintain key datasets. All applicable laws and PUCT rules related to the line-of-business data systems below are implemented by ERCOT Protocols, including how ERCOT manages and discloses the appropriate data. The table below provides a summary of ERCOT's key business operation datasets and describes generally the type of data housed in the systems. The table also identifies whether these data sets are available on the ERCOT Market Information List (EMIL). EMIL is a public information system that allows users to search market data and reports posted by ERCOT, including the data referenced in the table below.

ERCOT Key Datasets

Line of Business	Data System	Description of Dataset in System	Data Maintained By	Reports in ERCOT EMIL Inventory?
Operations	Energy Management System (EMS)	Manages the dispatch of real-time energy and ancillary services using data that includes forecasted load, generation output, transmission constraints, system frequency, and other real-time data across the ERCOT transmission system.	Operations Support	Yes
Operations	Network Model Management System (NMMS)	Manages the topology of transmission system (network model) using data that includes connectivity and modeling of transmission equipment, generation, and load.	Network Modeling Team	Yes

Line of Business	Data System	Description of Dataset in System	Data Maintained By	Reports in ERCOT EMIL Inventory?
Operations	Outage Scheduler	Manages requests and coordination of outages for reliable operation using data from transmission and generation companies. The requests are evaluated against the with system topology and load forecasts.	Outage Coordination	Yes
Operations	Forecasting (multiple systems)	Multiple systems that create datasets using vendor and ERCOT tools for managing Load forecasts, Wind production forecasts, and Solar production forecasts.	Operations Support	Yes
Operations/ Market Operations	Real-Time Market System: Security Constrained Economic Dispatch	Manages the dispatch of real-time energy using data based on energy offers, resource constraints, transmission constraints, and load.	Market Design and Analytics	Yes
Operations/ Market Operations	Market Management System: Reliability Unit Commitment and Resource Current Operating Plans	Manages the commitment of additional resources when needed using data based on load forecast, resource status, resources constraints, and transmission constraints. Allows Market Participants to submit plans for expected operations of the resources they represent.	Market Design and Analytics	Yes
Market Operations	Market Management System: Day-Ahead Market	Manages the Day-Ahead Market using data based on energy offers, ancillary service offers, resource constraints, congestion hedges, and transmission constraints.	Market Operations	Yes
Market Operations	Congestion Revenue Rights	Manages a forward market for securing transmission hedging positions up to three years in the future based on data from market bids, market offers, and the estimated transmission network capacity.	Market Operations	Yes
Market Operations	Demand Integration (multiple systems)	Manages the data for Demand Response products related to registration, qualification, testing and performance of Resources, such as ERS and Load Resources.	Demand Integration	Yes
Data Aggregation & Settlement	Data Aggregation & Settlement	Manages the aggregation and settlement of data related to the production or consumption of energy, ancillary services, and congestion costs in the day-ahead and real-time markets.	Data Aggregation & Settlement	Yes
Credit	Credit Monitoring & Management	Manages data related to the estimation of credit exposure based on market positions and invoices for each Market Participant.	Credit Monitoring & Management	Yes

Line of Business	Data System	Description of Dataset in System	Data Maintained By	Reports in ERCOT EMIL Inventory?
Planning	Planning (multiple systems)	Manages the data and tools in support of various areas of analysis related to the reliable planning of the future ERCOT system as it relates to long-term changes in load, transmission, and generation. The analysis conducted ranges from dynamic stability, to future economic growth impacts, to recommending locations of future transmission.	Planning	Yes
Retail	Retail Operations	Manages the data and processes related to retail customer choice transactions.	Retail Operations	Yes
Renewable Energy Credit	Renewable Energy Credit	Manages the data related to the Texas Renewable Energy Credits (REC) Trading Program are prescribed in PUCT Substantive Rule 25.173.	Renewable Energy Credit	Yes
Registration	Registration	Manages the data related to the system of record for entities registered with ERCOT, including company DUNs and subsidiary relationships, qualification status for different levels of participation, personnel contract information, and other attributes.	Registration	Yes

More detailed reporting information may be found on the EMIL. The link below provides direct links to the public reports on the webpage. There is also an exportable report inventory, tagged as "Export the full EMIL," which is an excel file listing all reports available.

ERCOT Market Information List (EMIL): https://mis.ercot.com/public/data-products?page=1

III. History and Major Events

1941 At the beginning of World War II, several electric utilities in Texas banded together as the Texas Interconnected System (TIS) to support the war effort. They sent their excess power generation to industrial manufacturing companies on the Gulf Coast to provide reliable supplies of electricity for energy-intensive aluminum smelting.

Recognizing the reliability advantages of remaining interconnected, the TIS members continued to use and develop the interconnected grid. TIS members adopted official operating guides for their interconnected power system and established two monitoring centers within the control centers of two utilities, one in North Texas and one in South Texas.

1970 TIS formed the Electric Reliability Council of Texas (ERCOT) in 1970 to comply with North American Reliability Council requirements. ERCOT was staffed by two retired utility employees.

1981 In 1981, TIS members transferred all operating functions to ERCOT, and ERCOT became the central operating coordinator for Texas. ERCOT opened its first office in 1986 and hired four full-time employees.

1995 In 1995, the Texas Legislature amended the Public Utility Regulatory Act to deregulate the wholesale generation market. The Public Utility Commission of Texas (PUCT) began the process of expanding ERCOT's responsibilities to enable wholesale competition and facilitate efficient use of the power grid by all Market Participants.

1996 On August 21, 1996, the PUCT endorsed an electric utility joint task force recommendation that ERCOT become an Independent System Operator (ISO) to ensure an impartial, third-party organization was overseeing equitable access to the power grid among the competitive Market Participants.

This change was officially implemented September 11, 1996, when the ERCOT Board of Directors restructured its organization and initiated operations as a not-for-profit ISO, making it the first electric utility industry ISO in the United States

1999 On May 21, 1999, the Texas Legislature passed Senate Bill 7, which required the creation of a competitive retail electricity market to give customers the ability to choose their retail electric providers, starting January 1, 2002.

2000 From 1999 to 2000, ERCOT sponsored a stakeholder process to address how ERCOT's organization would administer its responsibilities to support the competitive retail and wholesale electricity markets while maintaining the reliability of electric services.

In thousands of hours of meetings and mark-up sessions, the stakeholders or Market Participants worked together to develop new ERCOT Protocols – the rules and standards for implementing market functions regarding energy scheduling and dispatch, ancillary services, congestion management, outage coordination, settlement and billing, metering, data acquisition and

aggregation, market information systems, transmission and distribution losses, renewable energy credit trading, registration and qualification, market data collection, load profiling and alternative dispute resolution.

2001 On July 31, 2001, the existing ten control areas in the ERCOT region were consolidated into a single control area.

Wholesale power sales between electric utilities began to operate under the new electric industry restructuring guidelines, including centralization of power scheduling and procurement of ancillary services to promote reliability.

Commercial functions were centralized to facilitate efficient market operations, including meter data acquisition and aggregation, load profiling and statewide registration of retail premises to facilitate switching by customers between competitive electricity providers.

2002 On January 1, 2002, ERCOT launched the competitive retail electric market – on time and on budget – allowing individuals and corporations in most cities to choose power suppliers.

SB 7 applied specifically to investor-owned utilities, enabling customer choice for 6.5 million, but allowed municipal utilities and electric cooperatives (approximately 24% of the ERCOT load) to decide if they wanted to opt to participate in competition.

2003 In September 2003, as part of Project 26376, the PUCT ordered ERCOT to develop a nodal wholesale market design, with the goal of improving market and operating efficiencies through more granular pricing and scheduling of energy services.

2004 In August 2004, ERCOT launched a major transaction system upgrade, culminating a massive two-year project and representing the largest upgrade of the electronic transaction system since the retail market launch. Switching transactions averaged 38,000 per month and 9,000 per day during 2004.

Nueces Electric Cooperative (NEC) became the first cooperative or municipal utility to participate in the Texas competitive electricity market. NEC enrolled its first customer on September 1, 2004.

2005 By September 2005, more than 2 million total customer switches had been completed. Almost one-fourth of residential customers had switched to a competitive retail provider, in addition to 29 percent of small non-residential customers and 72 percent of large non-residential customers.

That September, the Texas Nodal Team submitted draft nodal protocols to the PUCT.

2006 On April 5, 2006, the PUCT signed an order approving the stakeholder-developed protocols for the nodal market, with an implementation date of January 1, 2009.

On August 17, 2006, a record high demand of 62,339 megawatts of power was used. Texas moved ahead of California as the top wind producing state.

2007 A record 3,220 MW of wind generation was added to the ERCOT grid for a total of 8,005 MW, maintaining Texas's lead as the top wind producing state.

Five years after launching the retail market, 46% of residential customers had switched from the incumbent utility.

2008 Almost 6,600 miles of transmission improvements were completed by 2008, and approximately 39,000 MW of new generation had been added to the grid.

2010 In late 2010, after many years of design and implementation work, ERCOT went live on a new nodal market structure. This included transitioning the grid from four zonal prices to 500 nodal prices (including a unique energy price for every generator); transitioning from 15-minute zonal dispatch to 5-minute resource-specific dispatch; and introducing a Day-Ahead Market and a Congestion Revenue Rights auction for improved market hedging.

2011 2011 was characterized by an unusually cold winter and an unusually hot summer. In February 2011, an intense arctic air mass swept over the southwest region of the United States, bringing heavy snowfall and persistent sub-freezing temperatures. As a result, over 210 generating units in ERCOT experienced an outage or derate, requiring 4000 MW of firm load shed. Following that storm, changes were made to operational and planning processes within ERCOT and to the ERCOT market, including a new emphasis on winterization of generating units, increased coordination with gas infrastructure, and new training to promote readiness and coordination during severe weather.

In summer 2011, Texas experienced the worst one-year drought in its history, causing devastating wildfires across the state. Over the course of the summer, some generators were derated due to cooling water issues, and transmission lines were damaged by wildfires, requiring ERCOT to issue Energy Emergency Alerts seven times during the summer months.

2012 Texas's residential and commercial electric markets ranked first in the Annual Baseline Assessment of Choice in Canada and the United States for the sixth consecutive year. Texas was the only market that achieved the top rating of "excellent" for both residential and commercial markets.

In June 2012, ERCOT launched its smartphone application, providing customers with real-time updates on the ERCOT grid, including information about electricity demand, generation and available reserves. The application sends "push" notifications to smartphone users when ERCOT is experiencing high demand and provides conservation tips to help keep the electric grid strong.

2013 The Competitive Renewable Energy Zone project was completed in 2013, supporting the integration of wind power from West Texas and the Panhandle to metropolitan areas across the state. In 2005, the Legislature directed the PUCT to identify and designate Competitive Renewable Energy Zones (CREZ) for the purpose of developing renewable generators and to develop a competitive process to build transmission facilities to connect these generators to the ERCOT system. The PUCT approved the CREZ transmission plan in 2008, directing the construction of transmission lines from the Panhandle and West Texas to load centers to the east. Utilities eventually constructed more than 3,500 miles of transmission lines capable of transferring more than 18,500 MW.

2014 In 2014, ERCOT implemented the Operating Reserve Demand Curve (ORDC) as the first major design change to the Nodal market design. The ORDC places a higher price and more value on energy produced during times of scarcity, incenting generators to run when most needed.

In January 2014, a winter storm hit Texas comparable to that from 2011. Although the ERCOT region experienced the loss of multiple generators, no rotating outages were required.

2015 ERCOT completed a multi-year data center refresh in 2015. The infrastructure refresh modernized, simplified and standardized the network, servers, and storage technologies across all ERCOT data centers.

2016 A comprehensive upgrade of ERCOT's Energy Management System (EMS) was completed in 2016. The EMS is the core system used to control and monitor the ERCOT grid.

ERCOT also completed addition of critical transmission improvements to support reliability in the Lower Rio Grande Valley, that has limited electric generation and transmission infrastructure, and began the evaluation of future transmission projects in that region to reduce the risk of outages.

2017 In August 2017, Hurricane Harvey – a devastating Category 4 hurricane – struck the Texas Gulf Coast, bringing with it winds of up to 130 MPH and over 50 inches of rain to some areas. While the ERCOT system experienced significant transmission line and generator outages, the overall electric system remained stable, and ERCOT's competitive markets continued to operate despite the extreme weather conditions.

The ERCOT grid continues to grow; in 2017, ERCOT added 5,400 MW in new generation resources and completed more than 170 screening studies for proposed generation projects.

2018 In 2018, stakeholders approved a market rule change allowing ERCOT to map Distributed Generation Resources (DGR) in ERCOT systems. DGRs are smaller generators located on lower voltages and have not been considered part of the traditional electric grid.

2019 On August 12, 2019, a new record high peak demand of 74,820 megawatts of power was used as Texas experienced a record-breaking heat wave. Notwithstanding, ERCOT maintained a reserve margin of 8.1% and experienced no loss of load.

2020 In 2020, the ERCOT grid exceeded 5,000 MW of solar generation and 20,000 MW of wind generation. To date, Texas has more interconnected wind generation than any other state.

In response to the COVID-19 pandemic, ERCOT successfully transitioned the organization into a majority-remote workforce supporting in-facility grid and market operations.

Real-Time Co-Optimization was also approved in 2020. Under ERCOT's longstanding market design, ERCOT assigns ancillary service responsibilities to generators based on a competitive, offer-based procurement of those services in ERCOT's Day-Ahead Market. This sometimes results in ERCOT dispatching less efficient units in real-time because more efficient generators are reserving their capacity in accordance with their ancillary services obligations. The solution to this issue is to "co-optimize" the procurement of energy and ancillary services in real-time, such that ERCOT always deploys the most efficient resources for energy while holding less-efficient units in reserve—referred to as "Real-Time Co-optimization" (RTC). In 2013, the PUCT opened a project to investigate the feasibility of introducing RTC in the ERCOT market and, after several years of evaluation, ordered ERCOT to implement RTC in 2018. ERCOT conducted a stakeholder process to develop and implement the many operational and market features of RTC. This process culminated in 2020 with the approval of revisions to ERCOT's Protocols specifying these details.

2021 From February 14 to February 18, 2021, Winter Storm Uri brought unprecedented sub-freezing temperatures to Texas, resulting in a rapid decrease in available power generation in the ERCOT region as power generation facilities were adversely impacted by the extreme cold weather. On February 15, 2021, ERCOT entered into Emergency Energy Alert Level 3, and, pursuant to their training and procedures, system operators directed power providers to reduce power output, or "shed load," to avoid a catastrophic grid failure. This action to preserve the grid, alongside the continued efforts of ERCOT system operators throughout the event, allowed approximately 75% of customers to retain power, and allowed service to be restored to customers as promptly as possible as more generation supply became available. As discussed previously, ERCOT is engaged in making substantial changes to its operations in response to the February 2021 extreme winter weather event, consistent with Legislative and regulatory direction.

In June 2021, approximately 70% of Lubbock Power & Light customers were transitioned from the Southwest Power Pool into the ERCOT region, adding roughly 470 MW of customer load and about 120 MW of generation to the ERCOT grid. This transition represents the culmination of six years of engineering work and regulatory approvals; it is the single largest transfer of customers in ERCOT's history. As a result, the ERCOT region now covers much of the Panhandle, allowing residents in the Lubbock area access to ERCOT's competitive-market rates.

IV. Policymaking Structure

A. Complete the following chart providing information on your policymaking body members.

The ERCOT Board of Directors

Member Name	Term / Appointment Dates*	Qualification	City
Mark Carpenter	1/1/21-12/31/21	Investor-Owned Utilities Segment	Dallas
Chris Ekoh	6/21/21 (no expiration)	Interim Public Counsel for the Office of Public Utility Counsel (OPUC) – *Ex Officio*	Austin
Keith Emery	1/1/21-12/31/21	Independent Power Marketer Segment	Arlington
Nick Fehrenbach	1/1/21-12/31/21	Commercial Consumers Segment	Dallas
Kevin Gresham	1/1/21-12/31/21	Independent Generators Segment	Austin
Tom Hancock	4/1/21-12/31/21	Municipally Owned Utilities Segment	Garland
Sam Harper	1/1/21-12/31/21	Industrial Consumers Segment	Midlothian
Brad Jones	5/4/21 (no expiration)	Interim President and CEO	Austin
Peter Lake	4/22/21 (no expiration)	PUCT Chairman (Non-Voting) – *Ex Officio*	Austin
Shannon McClendon	3/4/21-12/31/21	Independent Retail Electric Provider Segment	Galveston
Julie Parsley	3/9/21-12/31/21	Electric Cooperatives Segment	Johnson City
[Vacant]	--	Unaffiliated Member (Chair)	--
[Vacant]	--	Unaffiliated Member (Vice Chair)	--
[Vacant]	--	Unaffiliated Member	--
[Vacant]	--	Unaffiliated Member	--
[Vacant]	--	Unaffiliated Member	--
Segment Alternates			
Jim Brown	4/8/21-12/31/21	Independent Retail Electric Provider Segment	Houston
Kevin Bunch	1/1/21-12/31/21	Independent Power Marketers Segment	Houston
Mike Kezar	1/1/21-12/31/21	Electric Cooperatives Segment	Nursery
Glen Lyons	1/1/21-12/31/21	Industrial Consumers Segment	Spring

Member Name	Term / Appointment Dates*	Qualification	City
Jennifer Richie	1/1/21-12/31/21	Commercial Consumers Segment	Waco
Steven Schleimer	1/1/21-12/31/21	Independent Generators Segment	Houston
Judith Talavera	5/5/21-12/31/21	Investor-Owned Utilities Segment	Corpus Christi
Ian Taylor	1/1/21-12/31/21	Municipally Owned Utilities Segment	New Braunfels

***Please note:** the above chart is accurate as of this Report's submission. Per the recently-enacted Senate Bill 2, discussed in detail below, the composition of ERCOT's Board of Directors will change later in 2021.

B. Describe the primary role and responsibilities of your policymaking body.

The Board's primary responsibility is to manage the affairs of ERCOT, including ensuring that ERCOT maintains reliability and operates in a fair, efficient, and non-discriminatory manner.

In keeping with its fiduciary duties to ERCOT, the Board must establish the overall direction of the organization and establish its annual goals and objectives. These are developed and proposed by ERCOT staff for the Board's consideration. The Board must also review these goals and objectives on an ongoing basis and may issue policies and resolutions setting forth direction to ERCOT management to attain such goals and objectives.

The Board is also responsible for overseeing ERCOT's administration of the ERCOT Protocols.

C. How is the chair selected?

This year, during the 87th Regular Legislative Session, the Legislature made a number of changes to the governance of ERCOT, including the selection of its Board Chair. Previously, the Board's Chair and Vice Chair were elected annually by the Board from its unaffiliated membership. Effective June 8, 2021, however, ERCOT's Chair and Vice Chair will be selected by a newly created, three-member ERCOT Board Selection Committee. This Committee is charged with selecting each member to serve on ERCOT's Board and is also responsible for designating the Chair and Vice Chair from those Board members.

At the time of this Report's submission, the three members of the ERCOT Board Selection Committee were recently appointed. Accordingly, a new Board Chair has not yet been selected; the position is currently vacant. While the position of Board Chair has been vacant, at each Board meeting the Board has selected a member, such as the Chair of the PUCT, to preside.

D. List any special circumstances or unique features about your policymaking body or its responsibilities.

The structure and composition of ERCOT's Board was changed significantly during the recent Legislative Session. Those changes include:

- **Size of the Board:** The Board has been reduced in size from 16 to 11 members.

- **Composition of the Board:** ERCOT was previously governed by a hybrid Board, comprised of six representatives from various segments of the electricity market; five unaffiliated members; the Public Counsel of OPUC; the ERCOT CEO; and the Chair of the Public Utility Commission (non-voting). As of June 8, 2021, ERCOT's Board will be fully independent, comprised of members with no financial interest in the ERCOT market. Each member must have executive-level experience in any of the following professions: finance, business, engineering, trading, risk management, law, or electric market design.

- **Selection Process:** As mentioned above, ERCOT Board members will now be selected by the ERCOT Board Selection Committee—a committee created under Senate Bill 2. That Committee is composed of three members: one appointed by the Governor, one appointed by the Lieutenant Governor, and one appointed by the Speaker of the House. The Board Selection Committee must retain an outside consulting firm to help select Board members meeting the requirements outlined above. Recently, the Governor appointed Mr. Arch "Beaver" Aplin, President and CEO of Buc-ee's, to serve on the committee; the Lieutenant Governor appointed G. Brint Ryan, Chairman and CEO of Ryan, LLC; and the Speaker of the House appointed Bill Jones, an attorney and founder of the Jones Firm.

- **Residency Requirement:** All Board members now must be a resident of the State of Texas.

New ERCOT Board members have not yet been selected as of the time of this Report's submission. Updated information will be provided to the Sunset Advisory Commission when available.

E. In general, how often does your policymaking body meet? How many times did it meet in FY 2019? In FY 2020? Explain if the policymaking body met in-person or virtually during this time.

In general and under normal circumstances, the Board holds regularly scheduled meetings bimonthly (six meetings per year) with agendas available to the public at least seven days before the meeting. The Board may also hold strategic planning meetings, urgent meetings – which can be called on one hour's notice – and special meetings as necessary.

In Fiscal Year 2019, the Board held six regularly scheduled meetings. The Board met in-person for all six meetings.

In Fiscal Year 2020, the Board held six regularly scheduled meetings. The Board's first meeting was held in-person. Thereafter, meetings were held virtually for the remainder of the year due to the COVID-19 pandemic. Section 39.1511(a) of the Public Utility Regulatory Act (PURA) requires that all Board meetings be open to the public. Section 39.1511(b) provides that the Board may meet via teleconference or similar means, but only to consider urgent matters. In light of the COVID-19 pandemic and the resulting inability to safely accommodate medium to large in-person groups, beginning with the April 2020 regularly scheduled meeting, the Board began to cancel its regularly scheduled in-person meetings, and instead scheduled urgent meetings via WebEx on the same dates, but only to consider urgent matters that could not wait until the next regularly scheduled meeting.

Section 4.6(b) of the ERCOT Bylaws defines an "urgent matter" as "an emergency or public necessity (including but not limited to an imminent threat to public health and safety or to the ERCOT market or system), or a reasonably unforeseen situation," and adds, "a matter shall be considered an urgent matter if it would be difficult or impossible for a quorum of Directors or

subcommittee members to physically convene in one location and failure to consider the matter without delay may result in operational (including but not limited to those activities and functions affecting the ERCOT market or system), regulatory, legal, organizational or governance risk." As required under PURA § 39.1511(c), all Board meetings (except any portions that are executive sessions) are viewable by the public for free via live internet broadcasts accessible on the ERCOT website. Additionally, archived videos of prior Board meetings are available without charge at this link.

F. Please list or discuss all the training the members of the agency's policymaking body receive. How often do members receive this training?

All new Board members (including Segment Alternates) attend a Board Member Orientation, including a comprehensive unit on the ethical responsibilities of ERCOT Board service. Beginning in late 2020, in anticipation of three of five long-held Unaffiliated Director positions being replaced at the start of 2021, the three incoming Unaffiliated Directors received a comprehensive New Unaffiliated Director Orientation that included eight additional training sessions beyond the standard Board Member Orientation. (These orientation documents are voluminous and will be provided upon request).

Board members are also offered additional training opportunities. ERCOT has several ERCOT market training programs available to the Board for no charge. A list of some of the available training courses may be found on ERCOT's website at http://www.ercot.com/services/training.

Additionally, the Board's Finance and Audit (F&A) Committee typically holds three training sessions each year that are usually scheduled for the beginning of the relevant F&A Committee meeting. Board members that are not on the F&A Committee are also invited to attend. One of the three training sessions typically focuses on audit matters and is presented by ERCOT's independent financial audit firm, while the other two sessions focus on current relevant topics that may impact the F&A Committee or Board. As noted above, since early 2020, all Board (and Committee) meetings have been held as virtual meetings by WebEx, and business has been limited to urgent matters. Accordingly, in 2020, the F&A Committee agreed to suspend formal Committee education sessions until the resumption of regular meetings, and to communicate information regarding urgent topics through other appropriate agenda items, as necessary.

G. What information is regularly presented to your policymaking body to keep them informed about the agency's operations and performance?

As required under the ERCOT Bylaws, the CEO makes an annual report and periodic reports to the Board concerning the activities of ERCOT. In satisfying this requirement, the CEO presents a detailed Annual Certification of Internal Controls to the Board's Finance and Audit Committee and presents a CEO Update to the Board at each regularly scheduled meeting (and other meetings as needed). The CEO Update includes a financial summary, updates on major projects and key performance indicators, and other matters of importance for the Board.

The Board is also provided with the ERCOT Monthly Operational Overview report on a monthly basis, with details and statistics on system and market operations and forecast accuracy. In addition, the Technical Advisory Committee (TAC) provides a report to the Board on its activities at each regularly scheduled Board meeting. Additionally, the Independent Market Monitor (IMM) provides regular updates to the Board. These updates include the IMM's observations and recommendations. Further reports on specific matters of interest are presented from time to time, either at the Board's request or upon ERCOT staff suggestion.

H. How does your policymaking body obtain input from the public regarding issues under the agency's jurisdiction?

As required by PURA Section 39.1511(a), all ERCOT Board and Committee meetings, with the exception of Executive Sessions, are open to the public. ERCOT must also provide seven days' advance notice of meetings as well as planned agendas, which can be accessed through ERCOT's website. Urgent meetings may be held on shorter notice—not less than 1 hour—as the person or persons calling such meeting reasonably may deem necessary or appropriate. As previously discussed, ERCOT's Bylaws specify what may be addressed in an urgent meeting.

For in-person meetings, members of the public who attend have the opportunity to comment on matters under discussion. When the Board and its Committees started to hold urgent meetings via WebEx in 2020 due to the COVID-19 pandemic, to be able to maintain reasonable control over meetings, ERCOT provided the public with instructions that would allow the person wishing to comment to obtain a unique personal identifier, technical information on participation, and an allotted time limit in advance of the meeting.

Since Winter Storm Uri in February 2021, public interest in the ERCOT Board and its Committees has significantly increased. As a result, beginning with the February 24, 2021 urgent Board meeting, ERCOT has provided the public with instructions and contact information for providing public comments in writing on one or more of the agenda items in advance of each Board and Committee meeting.

How is this input incorporated into the operations of your agency?

ERCOT takes public input seriously. As noted in the response above, all ERCOT Board and Committee meetings, with the exception of Executive Sessions, are open to the public. Meetings of ERCOT stakeholder groups are also generally open to the public, with the limited exception of certain groups that handle matters that require discussion of sensitive information. The Board is also receptive to public comment outside of the meeting context, and any communications addressed to the Board that the company receives are provided to Board members.

Public input is also incorporated into ERCOT's operations through the participation of the Office of Public Utility Counsel (OPUC), which represents residential and small commercial customer interests, in ERCOT governance and the stakeholder process. The Public Counsel of OPUC is an ex officio member of the Board. In addition, the Public Counsel designates a representative to serve on the Technical Advisory Committee (TAC), and OPUC representatives are eligible to serve on TAC subcommittees and frequently do so. All significant system and market operations matters typically receive thorough vetting through the stakeholder process.

Finally, the PUCT, consistent with its complete oversight of ERCOT, may direct or guide policies, priorities, and other initiatives in an effort to reflect public input the PUCT receives or to otherwise serve the public interest.

I. If your policymaking body uses subcommittees or advisory committees to carry out its duties, fill in the following chart.

Information about ERCOT's subcommittees, as they currently stand, is provided in the chart below. However, the size, composition, and duties of these subcommittees will be modified to reflect the recent legislative changes to the composition of ERCOT's Board.

ERCOT Subcommittees

Name of Subcommittee	Size / Composition	How Members are Appointed	Purpose / Duties	Legal Basis for Committee
Human Resources & Governance Committee	The Committee is currently comprised of 4 members from the Board (typically 7 members, but there are presently 3 vacancies due to unfilled Unaffiliated Director positions).	Board appoints members.	Decisions including CEO compensation; CEO evaluation; executive compensation; succession planning; employee compensation and benefits; Board training; governance matters (e.g., governing documents, Board policies and procedures); government relations.	ERCOT Bylaws
Finance & Audit Committee	The Committee is currently comprised of 4 members from the Board (typically 7 members but there are presently 2 vacancies due to unfilled Unaffiliated Director positions).	Board appoints members.	Decisions including ERCOT budget; financing; investments; credit standards; audits (external and internal).	ERCOT Bylaws
Nominating Committee	The Committee consists of all the voting members of the Board, with the exception of the CEO. There are currently 9 members (typically 14 members, but there are 5 vacancies due to unfilled Unaffiliated Director positions).	Nominating Committee members are *ex officio* on account of their Board positions.	Decisions regarding nominations for Unaffiliated Director positions.	ERCOT Bylaws
Technical Advisory Committee (TAC)	30 members made up of Market Participants and customer representation.	Elected or appointed by Market Segments or Customer Representatives.	Decisions regarding the ERCOT market and reliability, including revisions to the ERCOT Protocols	ERCOT Bylaws
Protocol Revisions Subcommittee (PRS)	14 members made up of Market Participants and customer representation. Each Voting Entity present at a meeting may vote.	Elected or appointed by Market Segments or Customer Representatives.	Decisions regarding Protocol revisions.	ERCOT Bylaws
Reliability & Operations Subcommittee (ROS)	26 members made up of Market Participants and customer representation.	Elected or appointed by Market Segments or Customer Representatives.	Decisions regarding reliability and grid operations.	ERCOT Bylaws
Retail Market Subcommittee (RMS)	21 members made up of Market Participants and customer representation.	Elected or appointed by Market Segments or Customer Representatives.	Decisions regarding retail market issues.	ERCOT Bylaws
Wholesale Market Subcommittee (WMS)	28 members made up of Market Participants and customer representation.	Elected or appointed by Market Segments or Customer Representatives.	Decisions regarding wholesale market issues.	ERCOT Bylaws

V. Funding

A. Provide a brief description of your agency's funding, including information about the most recent five percent budget reduction and any funding related to disaster relief or COVID-19, if applicable.

ERCOT is an independent, nonprofit corporation governed by a board of directors and subject to oversight by the PUCT and the Legislature. ERCOT is not tax-payer funded, and its budget is not set by the Legislature; instead, as a part of the PUCT's oversight authority, the PUCT is responsible for overseeing virtually all aspects of ERCOT's financial operations, including the review and approval of ERCOT's budget and any fees charged by ERCOT. To that end, the PUCT has authorized ERCOT to charge a system administration fee that funds most of ERCOT's budget.

The ERCOT system administration fee, which represents approximately 97% of ERCOT's total base operating revenue requirement, is paid by wholesale users of the power grid. ERCOT converts the fee into a charge to each Qualified Scheduling Entity using the formula set forth in the ERCOT Protocols, which is based on actual volume consumption of electricity. Since 2016, the system administration fee has been set by the PUCT, based on ERCOT's requests, at 55.5 cents per megawatt-hour (MWh), which, if this were passed directly to end-use customers, would average about 56 cents per month, or $7 per year, based on 1,000 kilowatt-hour usage per month.

Revenues from the system administration fee, together with the other revenue derived from miscellaneous smaller authorized fees, must be sufficient to cover all portions of the ERCOT budget, including ongoing operations, equity for capital projects, administrative overhead, and debt service. In addition to these traditional costs, ERCOT must include the cost necessary to fund the Independent Market Monitor, protocol compliance functions, and the cybersecurity monitor within its budget. *See infra*, Statutory Authority (setting forth the requirements that ERCOT fund these costs).

ERCOT submits a biennial budget to its Board and, ultimately, the PUCT for final approval, which includes any requested change to the system administration fee. ERCOT's 2020-2021 budget continues to maintain the system administration fee at 55.5 cents per MWh. ERCOT anticipates maintaining a flat system administration fee through the end of 2023; at the August 2021 ERCOT Board meeting, the Board voted to approve an ERCOT budget for 2022-23 that includes maintaining the current system administration fee. At the time of submission of this report, the budget will next be submitted for the PUCT's consideration. ERCOT remains dedicated to seeking opportunities to improve operational efficiency, as well as continue cost-management initiatives that have enabled ERCOT to postpone or minimize fee increases regardless of additional costs associated with the increasingly complex electric industry.

B. List all riders that significantly impact your agency's budget.

Not applicable.

C. Show your agency's expenditures by strategy.

ERCOT Expenditures by Strategy
Fiscal Year 2020 (Actual)

Goal / Strategy	Amount Spent	Percent of Total	Contract Expenditures Included in Total Amount
Information Technology	$75,615,563	43.65%	$5,421,309
Grid Planning & Operations	$35,230,358	20.34%	$1,659,189
Commercial Operations	$15,123,717	8.73%	$266,342
Security & Compliance	$14,360,724	8.29%	$460,319
Finance	$7,894,035	4.56%	$275,520
External Affairs & Corporate Communications	$6,411,083	3.70%	$132,397
Corporate Strategy & PUC Relations	$5,938,980	3.43%	$252,915
Human Resources	$5,084,175	2.94%	$706,747
General Counsel	$4,944,780	2.85%	$842,393
Executive Administration	$1,065,717	0.62%	-
Internal Audit	$998,548	0.58%	-
Chief Administrative Office	$544,813	0.31%	-
TOTAL:**	**$173,212,493**	**100%**	**$10,017,131**

**** This table does not include ERCOT organizational expenses (e.g., ERO Fee Assessment, Independent Market Monitor costs) or project expenditures.

D. Show your agency's sources of revenue. Include all local, state, and federal appropriations, all professional and operating fees, and all other sources of revenue collected by the agency, including taxes and fines.

ERCOT Sources of Revenue — Fiscal Year 2020 (Actual)

Source	Amount
ERCOT System Administration Fee	$212,184,820
NERC Electric Reliability Organization Fee Pass-Through	$19,400,064
Interest Income	$4,298,273
Private Wide-Area Network Fees	$3,623,997
Generation Interconnection Study Fees	$1,978,555
Full Interconnection Study Application Fees	$791,650
Membership Fees	$282,500
Black Start Training Revenue	$112,708
Registration Fees Revenue	$76,040
Late Fees	$4,492
Cybersecurity Monitor Revenue	$3,950
Special Project Billing	$2,465
Miscellaneous Revenue	$473
TOTAL	**$242,759,987**

E. If you receive funds from multiple federal programs, show the types of federal funding sources.

ERCOT receives no funds from federal programs.

F. If applicable, provide detailed information on fees collected by your agency. Please explain how much fee revenue is deposited/returned to the General Revenue Fund and why, if applicable.

ERCOT Fee Revenue — Fiscal Year 2020

Fee	Description	Current Fee	Nodal Protocol Reference	No. of Persons or Entities Paying Fee	Fee Revenue	Where Fee Revenue is Deposited
ERCOT System Administration Fee	Used to fund ERCOT activities subject PUCT oversight. This fee is charged to all Qualified Scheduling Entities (QSEs) based on Load represented.	$0.555/MWh	9.16.1	155	$212,184,820	ERCOT Operating Account
Private Wide-area Network Fees	Actual cost of using third-party communications network.	Actual cost of initial equipment installation , not to exceed $25,000 Actual cost of monthly network management fee, not to exceed $1,500	9.16.2	55	$3,623,997	ERCOT Operating Account
Generation Interconnection Study Fees	Fee charged in connection with application to interconnect generation meeting the requirements to the ERCOT Transmission Grid.	$5,000 (less than or equal to 150 MW) $7,000 (greater than 150 MW)	9.16.2	236	$1,978,555	ERCOT Operating Account
Full Interconnection Study Application Fees	Fee to support ERCOT system studies and coordination. Applicable MW amount per Planning Guide Section 5 (Generation Resource Interconnection or Change Request).	$15 per MW	9.16.2	203	$791,650	ERCOT Operating Account

Fee	Description	Current Fee	Nodal Protocol Reference	No. of Persons or Entities Paying Fee	Fee Revenue	Where Fee Revenue is Deposited
Registration Fees	Application fees charged to Qualified Scheduling Entities, Competitive Retailers, Congestion Revenue Right Account Holders, and Independent Market Information System Registered Entities	$500 per entity	9.16.2	152	$76,040	ERCOT Operating Account
Membership Fees	Annual dues for ERCOT members	$2,000/ Corporate $100/ Residential and Commercial Customer $500 /Associate or Adjunct	N/A	271	$282,500	ERCOT Operating Account
Voluminous Copy Fee	--	$0.15 per page in excess of 50 pages	N/A	0	$0	ERCOT Operating Account
Map Sales Fees	--	$20 – $40 per map request (by size)	9.16.2	0	$0	ERCOT Operating Account

VI. Organization

A. Provide an organizational chart that includes major programs and divisions, and shows the number of FTEs in each program or division. Detail should include, if possible, department heads with subordinates, and actual FTEs with budgeted FTEs in parenthesis.

See Attachment 30, ERCOT Organizational Chart.

B. If applicable, fill in the chart below listing field or regional offices.

ERCOT FTEs by Location — Fiscal Year 2021

Headquarters, Region, or Field Office	Number of Budgeted FTEs FY 2021	Number of Actual FTEs (as of July 2021)
Austin Campus	35	34
Taylor Campus	730	721
Bastrop Campus	6	6
TOTAL:	**771**	**761**

C. What are your agency's FTE caps for fiscal years 2019–22?

Not applicable.

D. How many temporary or contract employees did your agency have in fiscal year 2020? Please provide a short summary of the purpose of each position, the amount of expenditures per contract employee, and the procurement method of each position.

In Fiscal Year 2020, ERCOT had a total of 94 temporary contract employees accounting for approximately $9.8 million in expenditures. A description of these positions and their procurement methods is available in Attachment 31.

E. List each of your agency's key programs or functions, along with expenditures and FTEs by program.

ERCOT List of Program FTEs and Expenditures — Fiscal Year 2020

Program	Actual Expenditures FY 2020	Budgeted Expenditures FY 2021	Actual FTES FY 2020
System Operations - Control Center	$8,782,189	$8,980,751	53
System Operations – Training	$1,682,261	$2,198,342	7
Operations Engineering & Support	$4,217,009	$4,457,673	27
Transmission Operations Planning	$1,817,100	$2,111,674	12
Regional Planning	$2,503,174	$3,036,980	14
Transmission Planning Assessment	$1,727,585	$1,751,007	11
Resource Adequacy	$1,481,508	$1,211,136	6

Program	Actual Expenditures FY 2020	Budgeted Expenditures FY 2021	Actual FTES FY 2020
Load Forecast & Analysis	$1,300,314	$1,165,556	6
Operations Analysis	$1,435,722	$1,603,800	8
Resource Integration	$1,942,395	$1,998,324	10
Engineer Development Program	$902,726	$424,035	9
Grid Coordination Support & Development	$3,809,752	$3,855,511	29
Renewable Energy Credit (REC) Program Administration	Included with Settlement Metering	Included with Settlement Metering	1
Market Rules & Stakeholder Support	$736,818	$795,107	6
Settlement Metering	$1,897,991	$2,028,585	11
Data Loading & Aggregation	$939,698	$957,755	5
Settlement Operations	$730,230	$777,161	6
Settlement Services	$1,062,017	$1,178,445	9
Retail Operations	$1,213,998	$1,342,854	8
Market Design	$877,544	$1,610,181	7
Market Validation	$768,021	$857,488	6
Congestion Revenue Rights	$872,261	$921,360	7
Day-Ahead Market	$784,146	$1,149,248	7
Demand Integration	$965,217	$1,010,024	5
Credit Risk Management	$768,704	$938,048	5
Passport Program	No Actuals for 2020	No Budget for 2021	11
Client Services	$2,184,787	$2,526,800	15
Market Support Services	$837,357	$865,811	6
Market Training	$892,863	$1,150,432	5
Cybersecurity	$3,724,978	$3,906,468	14
CIP & Corporate Compliance	$1,308,030	$1,396,932	7
Operations Planning & Compliance	$1,276,688	$1,387,622	8
TOTAL	**$53,443,084**	**$57,595,110**	**341**

VII. Guide to Agency Programs

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**System Operations – Control Center**
Location/Division	Taylor, Bastrop / Grid Operations
Contact Name	Dan Woodfin
Number of FTEs as of FY 2020	53
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

ERCOT System Operators, working from the ERCOT Control Center, have the responsibility and authority to direct the real-time actions of all generating plant and transmission line operators in the ERCOT region for the stable and reliable operation of the Bulk Electric System (BES) during normal and emergency conditions. ERCOT is the only entity registered with North American Electric Reliability Corporation (NERC) to perform the functions of Reliability Coordinator and Balancing Authority in the ERCOT region. ERCOT shares the Transmission Operator Authority with Transmission Operators in the region; ERCOT does not have direct operational control over any BES equipment for the ERCOT region.

Major Activities:

Grid Operations. With respect to operating and maintaining the grid, the Control Center:

- Requests and receives information required to continually monitor and direct the operation of the ERCOT BES for its security and reliability in accordance with the ERCOT Protocols, Operating Guides, and NERC Reliability Standards;

- Operates the ERCOT BES 24 hours a day, seven days a week, utilizing advanced network analysis applications—including State Estimator, Real Time Contingency Analysis, Real-Time and Study Mode Operations Power Flow, Voltage Stability Analysis and Dynamic Stability Analysis—to continuously monitor the 46,500 miles of transmission lines and approximately 710 generation units in the ERCOT Interconnection to maintain security and reliability of the ERCOT system;

- Performs security analyses on a day-ahead basis and manages congestion on a real-time basis to ensure the ERCOT system is operated such that the outage of any single facility (Contingency) in the system will not cause:

- the uncontrolled breakup of the transmission system;
- loading of transmission facilities above their defined emergency ratings, which cannot be eliminated in time to prevent damage or failure; or
- operation at transmission voltage levels outside system design limits, which cannot be corrected through execution of specific, predefined operating procedures before voltage instability or collapse occurs;

- Receives all specified notifications from Market Participants regarding energy transactions, generation control modes, routine adjustments, and equipment limitations or outages;

- Ensures compliance with the ERCOT Protocols and Operating Guides on identified transfer limits;

- Reviews the Daily Operations Plan, and calculates and publishes the allocated Responsive Reserve, Regulation, and Non-Spin Reserve Service obligations;

- Ensures the Day-Ahead Market (DAM) procures the Up Regulation, Down Regulation, Responsive Reserve and Non-Spin Reserve capacity for real-time operations;

- Runs the Day-Ahead Reliability Unit Commitment (DRUC) daily so that the ERCOT grid has sufficient generation capacity and Ancillary Services to resolve projected transmission and resource constraints to meet system load expectations;

- Runs Hourly Reliability Unit Commitment (HRUC) each hour so that the ERCOT grid has sufficient generation capacity and Ancillary Services to resolve projected transmission and resource constraints to meet system load expectations;

- Performs voltage security assessments, using the Voltage Security Assessment Tool (VSAT), on various locations within ERCOT. VSAT executes every 10 minutes, and can be executed manually as required;

- Calculates Real-Time Contingency Analysis (RTCA) to evaluate the reliability of the ERCOT system, and to determine real-time and predicted post-contingency exceedances with System Operating Limits (SOL). RTCA has approximately 8,825 contingency scenarios being processed, executes every five minutes, and can be executed manually as required;

- Performs Short-Term Load Forecasting and Mid-Term Load Forecasting, which are used in the DRUC and HRUC applications;

- Operates the Load Frequency Control (LFC) system to maintain grid frequency at 60 Hz;

- Deploys Regulation and Responsive Reserves;

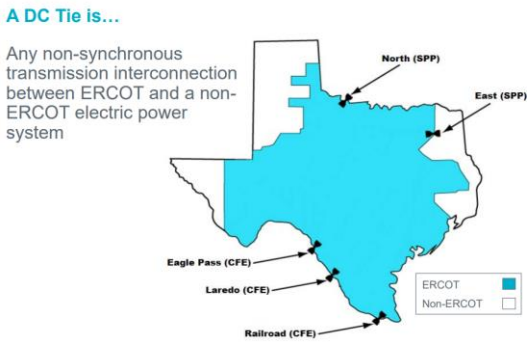
- Performs Ancillary Service Capacity Monitor calculations every ten seconds;

- Performs analyses on expected grid conditions and identifies hours when inertia levels may not be sufficient;

- Monitors in real-time the critical inertia levels based on actual conditions;

- Implements Energy Emergency Alert(s) when conditions create a potential generation capacity shortage. This may include directing the load shedding to maintain the integrity of the ERCOT system;

- Manages the DC-Tie scheduling and inadvertent energy accounting for the DC Ties ERCOT shares with the Southwest Power Pool and Centro Nacional de Control de Energia (*see below*);



- Obtains and/or arranges to provide emergency energy over the DC Tie(s) with other Regions to prevent emergency operations within the ERCOT system;

- Issues appropriate operating condition notices, advisories, Advance Action Notices, watches, and emergency notices;

- Coordinates the reduction or cancellation of transmission maintenance outages and the re-dispatch of generation;

- Coordinates the ERCOT System Restoration (Black Start) Plan in the event of an ERCOT-wide power system failure. Specifically, System Operators will direct the reconnection efforts of the islands established by restoration activities, and will coordinate the mutual assistance activities of the ERCOT participants during system restoration activities; and

- Requests, orders, or takes other actions that are deemed necessary to maintain safe and reliable operating conditions on the ERCOT system in accordance with ERCOT Protocols, Operating Guides, and NERC Reliability Standards.

Audits. With respect to internal and external audits, the Control Center:

- Facilitates all procedural compliance audits performed by the ERCOT Internal Audit;

- Facilitates compliance audits performed by the Texas Reliability Entity (the NERC Regional Entity), NERC, and FERC to ensure reliability standards and procedures are being followed; and

- Acts as subject matter experts for the preparation and interview process of the annual NERC Compliance Audit.

Training and Working Groups/Committees. With respect to offering training and expertise, the Control Center:

- Participates in the ERCOT Operations Working Group and Operations Task Force stakeholder meetings;

- Represents the ERCOT region at the following NERC subcommittees and working groups: NERC Reliability and Security Technical Committee, Real Time Operating Subcommittee, NERC Situational Awareness, FERC and Regional Entities Working Group;

- Serves as subject matter experts to facilitate the completion of projects that involve new or enhanced computer systems used by System Operators;

- Provides training and Lessons Learned to System Operators during their training cycle; and

- Provides training on operations topics at the Annual ERCOT Operations Seminar.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

The Control Center's primary mission is to run the day-to-day operations of the Texas electric market and maintain the reliability of the grid. Accordingly, this program is an example of "no news is good news." Seen below, nearly every day over the past decade has been a "no news" day in which system operators have successfully maintained the grid—ERCOT has had only 19 EEA days since 2011, more than half of which are attributable to the 2011 drought and resulting wildfires.

List of EEA Days since 2011:

2/2 – 2/3/11	EEA3	8/23/11	EEA1
3/23/11	EEA1	8/24/11	EEA2A
6/27/11	EEA1	1/6/14	EEA 2
8/2/11	EEA1	1/18/14	EEA 1
8/3/11	EEA1	8/13/19	EEA 1
8/4/11	EEA2B	8/15/19	EEA 1
8/5/11	EEA1	2/15 – 2/19/21	EEA 3

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

Although the core purpose of the Control Center team has remained the same, the specific tasks required are continuously changing due to changes in the electric industry, NERC Reliability Standards, and ERCOT Protocols and Operating Guides. In January 2017, a new desk was added to each control room shift and additional monitoring tools were provided to better manage the increasing amount of intermittent, renewable resources in the ERCOT system.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The Control Center directly monitors and responds to grid conditions, and thus maintains the stability of the entire ERCOT region. Because of this critical role, NERC Reliability Standards

require each System Operator to possess a NERC Reliability Coordinator Operator Certification prior to independently operating a desk on the control room floor. This certification is acquired by successfully completing an exam and is maintained by completing 200 hours of continuing education requirements, as specified by NERC, over a three-year period. All 52 employees in this program hold the required NERC Reliability Coordinator Operator Certification.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The processes and procedures used in the ERCOT Control Center are highly detailed and complex. A high-level outline of these procedures is provided in Question A above. More information about Control Center procedures may be found at http://www.ercot.com/mktrules/guides/procedures.

G. Identify all funding sources and amounts for the program or function.

The program is fully funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $8,980,751.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

This program participates with NERC on the Real Time Operations Subcommittee (RTOS) meeting with other grid operators. The RTOS assists the NERC Reliability and Security Technical Committee (RSTC) in enhancing Bulk Electric System (BES) reliability by providing operational guidance to the industry; providing oversight to the management of NERC-sponsored information technology tools and services supporting operational coordination; and providing technical support and advice as requested. Working directly with these teams help ensure best practices are used in the ERCOT Region.

The program also facilitates compliance audits performed by the Texas Reliability Entity, NERC and FERC to ensure System Operators follow the requisite reliability standards and procedures.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**System Operations – Training**
Location/Division	Austin, Taylor / Grid Operations
Contact Name	Bill Blevins
Number of FTEs as of FY 2020	7
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

System Operations Training (SOT) provides task and knowledge-based training for ERCOT System Operators to ensure they are prepared to reliably operate the ERCOT Bulk Power System during normal, abnormal, and emergency conditions.

Major Activities:

Training Development and Delivery: In accordance with NERC Reliability Standard PER-005-2, ERCOT SOT uses a systematic approach to develop and implement a training program for its System Operators by:

- analyzing, identifying, and creating a list of Bulk Electric System (BES) company-specific Real-time reliability-related tasks based on a defined and documented methodology;
- designing and developing training materials based on this task list;
- implementing delivery of training to System Operators; and
- evaluating the training program each calendar year.

NERC Certification: ERCOT SOT ensures that System Operators, performing reliability-related tasks, maintain their required NERC Reliability Coordinator (RC) certification.

Continuing Education: NERC recognizes ERCOT SOT as a Level 3 Continuing Education (CE) Provider that adheres to NERC CE Program Criteria. As such, ERCOT SOT develops and delivers approved learning activities for which NERC CE hours can be awarded to meet the certificate renewal requirements specified in the NERC System Operator Certification Manual.

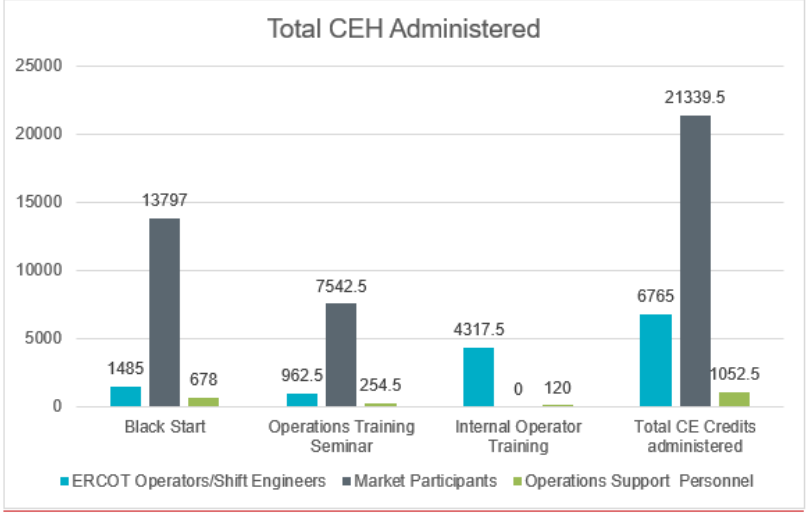
Documentation: ERCOT SOT retains all appropriate documentation in accordance with ERCOT Operating Procedures and NERC standards.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Every ERCOT System Operator has achieved and maintained the required NERC Reliability Coordinator Certification. This certification requires passing the written NERC certification exam and maintaining annual approved Continuing Education Hours (CEHs). System Operations Training is responsible for preparing operators for the exam and ensuring all operators receive the required number of NERC approved CEHs. Operator feedback has consistently reported that training using the operations training simulator has prepared them to effectively respond to similar real-life scenarios.

Feedback from Market Participants who have attended the annual Black Start training and severe weather exercises have likewise reported that the training and exercises helped them be better prepared for events such as hurricanes. Market Participants also benefit greatly from affordable CEHs offered at the Operations Training Seminar and at Black Start training.

CEH credits administered for events in 2019 are pictured below because that year is more representative of trainings ERCOT regularly provides. During 2020, due to the COVID-19 pandemic, ERCOT provided some computer-based training modules in lieu of on-site trainings to help Market Participants obtain CEH credit. Internal operator training continued to be held on site, following public health guidelines such as social distancing.



D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The initial ERCOT training program was aimed at simply preparing ERCOT operators to do their job. However, as new NERC Standards and Protocols have been added over the years, the amount of training provided has increased, and more simulation training is required. The ERCOT System Operations Training program is subject to NERC Audit on all training requirements.

ERCOT training procedures must also be continuously updated to reflect current ERCOT operations. Generally speaking, ERCOT trains its operators on systems used in the Control Center as those systems are upgraded. And in 2010, when ERCOT moved from a Zonal Market to a Nodal Market, simulations were changed to reflect the new Nodal Market systems. In 2019, ERCOT completed construction of a new operator training center for ERCOT-operator and market-participant trainings. Recently, due to COVID-19 impacts, changes were made to allow training to

occur remotely. The ERCOT training program will continue to adjust to provide ERCOT operators, support staff, and Market Participants with relevant and required training.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

This program provides training for ERCOT System Operators and for Market Participants.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

An outline of the training administered by SOT is provided below:

Training Provided	Description
Classroom and simulation continuing education hours during cycle training	SOT provides, on average, 70-plus Continuing Education (CE) Hours to ERCOT System Operators and Shift Engineers. ERCOT System Operations management ensures that System Operators receive a dedicated week of continuing training as part of the normal crew rotation schedule (cycle training). ERCOT SOT plans and coordinates the course offerings and communicates the schedule with all relevant ERCOT groups. In addition, SOT provides annual training for System Operators to meet the NERC CE criteria during their scheduled cycle training.
NERC Reliability Coordinator Certification Credential Maintenance for ERCOT System Operators	Provides a minimum of 30 hours of training on NERC Standards; a minimum of 30 hours of Simulations; and 200 hours of operating topics over a three-year period.
Operator Development Program	The initial Operator Development Program currently consists of 21 instructor-delivered courses ranging from a basic introduction to a very detailed instruction on the various System Operations processes and applications. The program consists of simulations, instructor-led courses, and online coursework. Since its inception, this program has been delivered to all new system operators.
Black Start Training	In a normal year, ERCOT delivers an on-site Black Start training to Market Participants. This training consists of instructor-led knowledge topics and simulations using ERCOT's power simulator. This is a 7-week training with approximately 800 attendees. Nodal Operating Guide 1.5.2 (5) makes ERCOT Black Start training attendance mandatory for all Transmission Operators, Qualified Scheduling Entities identified in a Black Start restoration plan, Resource Entities that represent Black Start Resources, and other entities who are notified by ERCOT that their participation is required.
ERCOT Annual Operations Training Seminar	Pursuant to Nodal Operating Guide 1.5.3, ERCOT hosts an annual training seminar. The purpose of the training seminar is to provide a forum for system-wide problems to be effectively addressed, analyze common topics and issues, and participate in formal training sessions. The training seminar presents information to maintain the consistency of operators across the ERCOT region.
ERCOT Severe Weather Drill	Pursuant to Nodal Operation Guide 1.5.4, an annual severe weather drill is held to test the scheduling and communication functions of the primary and/or backup control centers and to train operators in emergency procedures.

NERC GridEx	ERCOT SOT participates in NERC GridEx training every 2 years. This is a voluntary industry-wide simulation training containing aspects of cyber and physical attacks on the grid.
Real-time Assessment (RTA) Simulation, including System Protection functions and limits	Simulation training that simulates the loss of normal real-time tools and requires backup methods of doing real-time system assessments.
Operations Support Personnel training	Provides training for staff who are not Control Center personnel, but who impact real-time tools and operating limits.
Communication Protocols Training	Required training covering issuing directives during normal and emergency operations.
Summer Readiness and Emergency Operations Training EEA	Control Center simulation training to simulate Energy Emergencies for summer conditions.
Nuclear Plant Interface Requirements Training	Training specific to managing nuclear plant specific requirements and coordination as they pertain to ERCOT grid operations.
Reliability Related Task training	Simulation Training to cover Control Center operator reliability tasks.
Control Center Recovery Plan (Loss of Primary Control Center with transition exercise)	Simulation training exercise to practice Control Center evacuation plans.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $2,198,342.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

SOT's contract expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to make the ERCOT System Operator Certification Exam available to Market Participants at multiple testing centers.

FY 2020 Expenditures: Because SOT's contract with the vendor began in 2021, there are no contract expenditures to report for Fiscal Year 2020.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Operations Engineering & Support**
Location/Division	Austin, Taylor / Grid Operations
Contact Name	Woody Rickerson
Number of FTEs as of FY 2020	27
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Operations Support & Engineering is responsible for all real-time and near-real-time engineering support to the System Operations Control Center. Operations Support & Engineering staff are responsible for triaging real-time and near-real-time system events; calculating System Operating Limits; facilitating changes to the network operations model; reporting on system events; developing mitigation plans associated with grid congestion; and providing front-line troubleshooting on software applications and databases used in the Control Center. Operations Support & Engineering is also responsible for processing and coordinating all Planned Transmission and Generation Outages.

Major Activities:

Operations Support & Engineering is responsible for the following critical functions:

- calculating and posting of Day-Ahead System Operating Limits for stability constraints and Direct Current (DC) Ties;
- performing a Next Day Study (NDS) each calendar day, as required by NERC Reliability Standards pertaining to Operational Planning Assessments (OPA);
- triaging performance issues with ERCOT systems, including, but not limited to: State Estimator, Real-Time Contingency Analysis, Voltage Stability Assessment, Study Network Analysis, Transmission Constraint Manager, Security Constrained Economic Dispatch, Reliability Unit Commitment, Renewable Generation Forecast, Load Forecast, and synchrophasor measurement recorder;
- generating and issuing Event Notifications to ERCOT Management for load loss events, wholesale price spikes, generation unit runback/trip events, and application failures;
- ensuring that a Real-time Assessment is performed at least once every 30 minutes, as required by NERC Reliability Standards;

- responding to and evaluating Real-time System Events, such as geomagnetic disturbances, unplanned outages, and severe weather, including hurricanes;

- performing short-term outage studies to facilitate Control Center staff requests;

- facilitating the implementation of network operations model changes, including equipment ratings, impedances, contingency definitions, stability constraint definitions, and Remedial Action Scheme definitions;

- developing Constraint Management Plans in response to real-time issues, and coordinating with other Market Participants on these issues;

- developing weekly Operations Study base cases used for all future studies performed by the Control Center staff, Shift Engineers, and Operations Engineers;

- registering new Market Participants to participate in scheduling energy across the DC Ties with neighboring electric grids;

- creating and posting all DC Tie-related outages to the ERCOT website as necessary;

- reviewing all new transmission equipment introduced to the network operations model, and issuing approvals to energize that new equipment as appropriate;

- notifying all parties affected by any outages that may impact nuclear plants, as required by NERC Reliability Standards pertaining to Nuclear Plant Interface Coordination;

- reviewing and reporting on all transmission congestion activities. Daily postings are required describing the reasons for any observed transmission congestion that was not addressed by ERCOT market systems in real-time. Similar monthly postings are also required;

- facilitating the interconnection of new generation resources into the ERCOT grid;

- receiving and processing transmission and resource outage requests to determine whether they contain all required information, and conducting security analysis studies of the ERCOT system, as appropriate, for the relevant outage timeframe;

- facilitating biannual outage coordination meetings with the ERCOT Transmission Operators in order to coordinate upcoming priority outages;

- maintaining the ERCOT Outage Scheduler by addressing each outage request within the timelines stipulated the ERCOT Protocols;

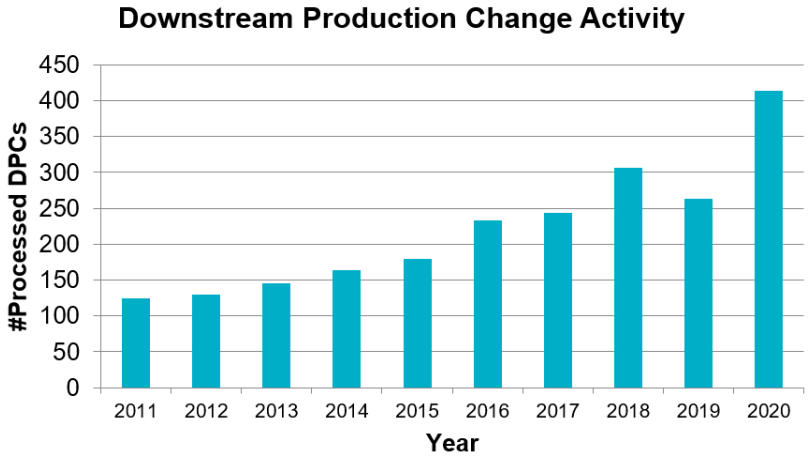
- providing priority outage information and support to real-time operations seven days a week;

- coordinating all conflicting outages between the transmission providers and generating entities; and

- providing outage information to ERCOT Planning Engineers for stability studies.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

- In 2020, Operations Support & Engineering processed over 400 Downstream Production Changes (DPCs) associated with on-line changes to the network operations model. The graph below illustrates the trend of increasing DPCs over the past decade. On-line model changes continue to increase as ERCOT strives to more effectively operate the grid.



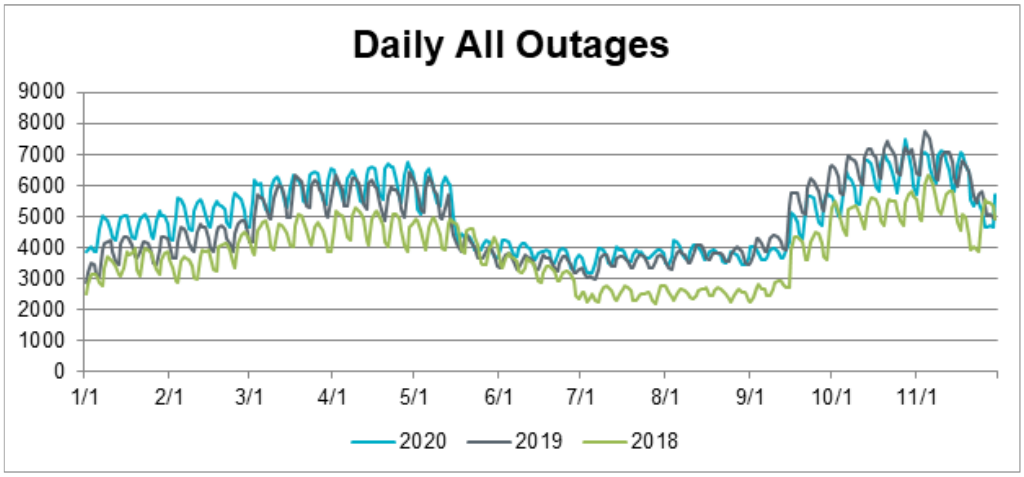
- The results of the Next Day Study are provided via email to all transmission utilities in the ERCOT region the day after the study is completed. This provides the opportunity for ERCOT to collaborate with impacted transmission utilities on operating plans for the reliable operation of the grid for the coming day.

- Event Notifications are provided to ERCOT Management in order to increase communication of real-time events to executive staff. This process ensures that ERCOT management can effectively communicate these issues with regulatory agencies and lawmakers.

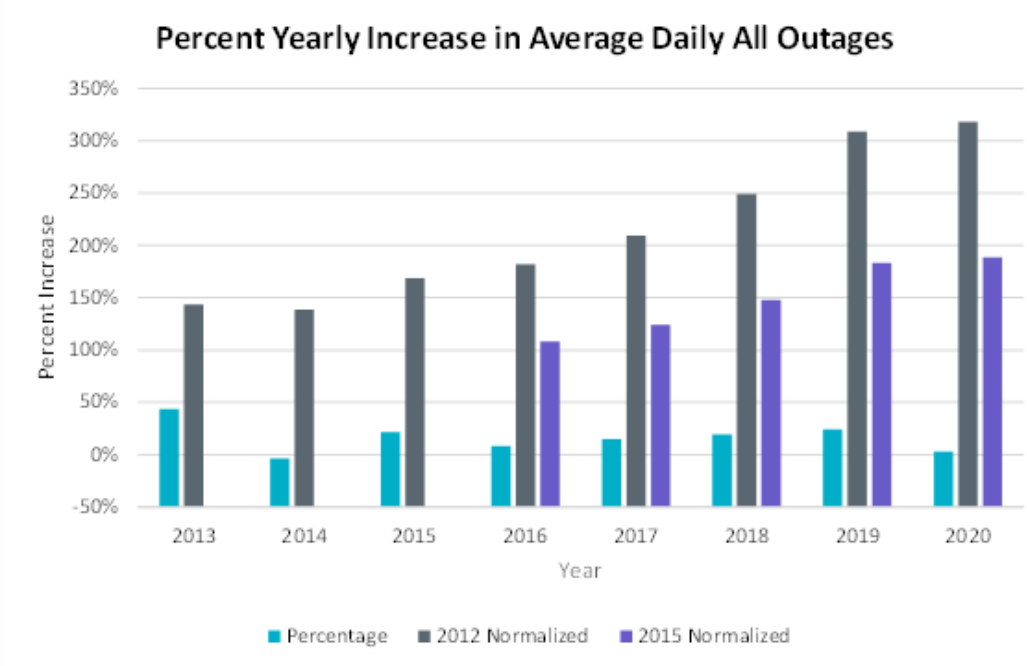
- The ERCOT grid experienced several significant weather events in the past few years, including Hurricane Harvey in 2017 and Winter Storm Uri in 2021. Operations Support & Engineering provided continuous support on-site during these events, including bringing available off-duty Shift Engineers to provide additional support during the critical periods of these storms to perform special system assessments, and to develop operating plans supporting the reliable operation of the grid as conditions changed rapidly.

- Operations Engineering & Support facilitates the implementation of any changes to stability-related constraints (Generic Transmission Constraints) that arise from Transmission Planning studies, and translates the results that will be used in the operations realm.

- The Outage Coordination teams processed nearly 160,000 outages in 2020 and has processed over 1,000,000 outages since the start of the ERCOT Nodal Market in 2010.



The graph above illustrates the number of active outages by day for 2018-2020. The drop in daily outages from May 15 to September 15 is the result of Summer Outage Restrictions that ERCOT began enforcing in 2019 to better meet demand during the summer peak load season. These restrictions were implemented not only to ensure the grid is prepared to handle the demand needs of the system during summer peak operations, but to also provide a means for performing maintenance on transmission infrastructure during the peak season without impacting the reliability of the grid.



The graph above illustrates outage impacts on an annual basis. The grey bars indicate that for every outage analyzed in 2012, the Outage Coordination team analyzed an approximately 318% increase in 2020. "The primary driver for the increase in the number of outages is the increase in the size and complexity of the ERCOT grid; for example, the amounts of generation and transmission equipment are increasing, and all of these facilities, on occasion, need to be placed in a planned outage for maintenance or may be forced out."

Finally, the table below provides a summary of the outages this program has processed since 2016.

Outage Processing Summary

All Outage Types	2016	2017	2018	2019	2020
Forced	14,569	15,186	15,320	15,510	15,607
Forced Extension	4,281	4,969	5,589	6,461	7,596
Maintenance Level 1	4,230	4,375	4,299	4,192	4,842
Maintenance Level 2	2,617	2,647	3,766	3,197	3,985
Maintenance Level 3	217	281	708	416	875
Planned	82,105	84,576	121,296	111,300	109,231
Unavoidable Extension	11,476	13,852	15,120	15,879	17,099
Simple	138	104	52	134	56
Opportunity	11	4	3	2	3
Remedial Switching Action	307	375	499	423	557
Total	**119,951**	**111,183**	**166,652**	**157,514**	**159,851**

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

With respect to its engineering support functions, the program has provided 24/7 engineering support via an on-call rotation outside of normal business hours since the inception of the ERCOT wholesale market. In 2008, the Shift Engineering team was created, which placed one Shift Engineer in the Control Center so that Control Center staff has 24/7 on-site engineering support in addition to the on-call rotation. Having an engineer in the Control Center at all times has increased the efficiency and efficacy of the Control Center staff, has reduced application downtime, increased situational awareness, and promoted innovation.

The Shift Engineering role has evolved significantly over the years and continues to evolve as new initiatives are implemented. Specifically, Shift Engineers are now performing geomagnetic disturbance assessments to address potential grid impacts; have been given new tools to ensure real-time assessments are conducted in line with new regulatory policies; and have been delegated the authority to issue operational notices for certain system events. While primarily assigned to address transmission-related reliability issues, Shift Engineers now find much of their time is spent triaging generation-related issues such as unit commitment, renewables forecasting errors, and scheduling conflicts.

The scope of this program's outage coordination functions has also increased significantly over the years. As illustrated in the graphs above, the number of outages processed each year continues to grow, which is consistent with a growing network model driven by transmission expansion and an expanding, more diverse generation fleet.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

This program affects both internal ERCOT operations and external stakeholders, as outlined below:

Internal Operations:

- Control Center System Operators;
- Grid Application Support staff;
- Energy and Market Management System Production Support staff;
- Market Operations Support staff;
- Transmission Operations Planning staff;
- Network Modeling staff;
- Wholesale Client Services Account Managers;
- Transmission Planning;
- Resource Integration; and
- ERCOT Management.

External Stakeholders:

- Transmission entities (transmission owners and operators);
- Generation entities (generator owners, operators, and developers);
- Energy traders; and
- DC Tie Operators.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The program is administered by one senior manager, one manager, and four supervisors.

The Operations Support & Engineering is split into four teams:

- **Operations Engineering –** provides engineering support during normal business hours, and participates in a 24/7 on-call rotation.

- **Shift Engineering –** provides engineering support on-site 24/7 in the Control Center, with one Shift Engineer assigned to each System Operator crew.

- **Near Term Outage Coordination and Long Term Outage Coordination –** the two Outage Coordination teams process outage requests and determine whether they contain all the required information; conduct security analysis studies of the ERCOT system, as appropriate, for the relevant Outage timeframe; and approve or reject the requests. Outage Coordination staff work with the transmission coordinators of each ERCOT transmission provider and with appropriate personnel at the Qualified Scheduling Entity (QSE) or generating facilities in managing outage requests.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $4,457,673.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Transmission Operations Planning**
Location/Division	Taylor / Grid Planning & Operations
Contact Name	Dan Woodfin
Number of FTEs as of FY 2020	12
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Transmission Operations Planning is one of ERCOT's core responsibilities, directly supporting ERCOT's directive to maintain the reliability of the system and provide open access to transmission. Transmission Operations Planning provides the foundation for operations planning activities performed by ERCOT, the Transmission and Distribution Service Providers (TDSPs), and other stakeholders.

The core functions of the program are to establish the system operating limits for real-time operations; provide support to system operators; and maintain grid reliability pursuant to NERC and ERCOT reliability standards.

Major Activities:

Transmission Operations Planning is responsible for the following major activities:

- performing transmission analyses required to support ERCOT system operations, including Quarterly Stability Assessments; Interconnection Reliability Operating Limit studies; outage coordination stability analyses; and defining and maintaining Generic Transmission Constraints to manage stability limits;
- performing pre-real-time operations tasks, such as Remedial Action Scheme reviews and Special System Operating Limit / Interconnection Reliability Operating Limit studies;
- conducting seasonal transmission studies, including the Seasonal Transmission Analysis, Constraint Management Plans, Geomagnetic Disturbance Plans, Voltage Profile studies, and Black Start planning;
- performing operations planning studies for event analysis; and
- implementing real-time dynamic stability analysis tools and other special ad hoc dynamic studies for operations.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

In 2020, Transmission Operations Planning:

- conducted a Quarterly Stability Assessment to assess the impact of planned new All-Inclusive Generation Resources connecting to the ERCOT system. Four QSA assessments were completed for new and repowering generators, including a total of 55 generators (new and repowering) with a total capacity of approximately 13.8 gigawatts;

- identified stability limits primarily in 12 areas and performed operational Generic Transmission Constraint (GTC) studies to identify the operating limits necessary to maintain system reliability;

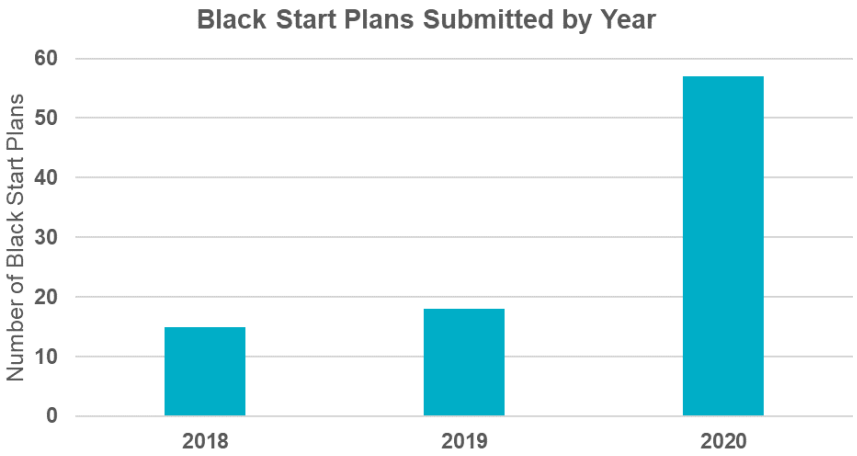
- established 5 new GTCs and updated several existing GTCs needed to manage area instability through appropriate market-based mechanisms in real-time;

- performed more than 40 outage coordination stability analyses to facilitate transmission maintenance outages; and

- conducted reviews of Annual Congestion Management Plans (CMP) that included 64 CMP proposals from eight different companies.

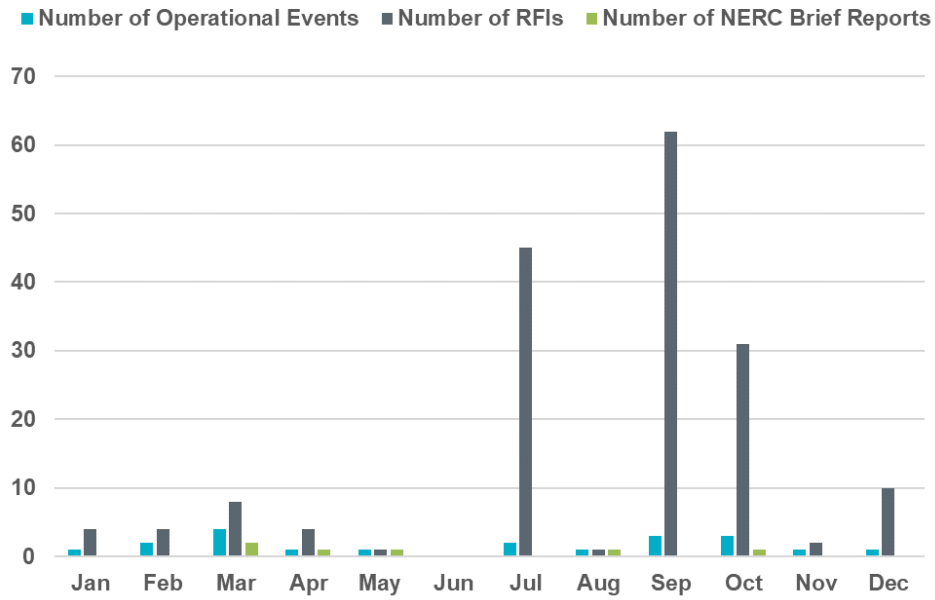
In addition, the program conducted Black Start Resource Procurement and Black Start Resource Testing; created ERCOT Black Start Plans; and reviewed all Transmission Owner (TO) Black Start Plans. All generation resources that are selected as a part of Black Start Resource Procurement are required to meet the qualification criteria defined in ERCOT Operating Guide 3.2.4. The 17 units (and their alternates) selected during the Black Start procurement process were tested in 2019 and all earned Black Start Unit Certifications that will expire in December 2021.

The figure below shows the number of Black Start Plans and revisions submitted over the past three years:



What's more, when a significant Operational Event occurs on the ERCOT system, Transmission Operations Planning follows up with Transmission and/or Distribution Service Providers or Qualified Service Entities; sends a Requests for Information (RFI) form; and conducts analysis of the event.

The figure below shows the number of RFI events, RFIs sent out, and NERC Brief Reports completed for each month of 2020:



D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

In 2018, the Transmission Operations Planning program was established upon the consolidation of various operations support activities previously performed by the System Planning, Resource Integration, and Grid Analysis groups. This consolidation and creation of Transmission Operations Planning was done to meet reliability challenges related to system dynamic stability issues and to provide support to real-time operations.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The Transmission Operations Planning program directly affects all ERCOT Market Participants.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager, two supervisors, and nine full-time employees.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $2,111,674.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Regional Planning**
Location/Division	Taylor / Grid Planning and Operations
Contact Name	Warren Lasher
Number of FTEs as of FY 2020	14
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Regional Planning program performs detailed transmission planning studies designed to identify cost-effective transmission projects that meet identified system needs in a timely manner, and promote the future reliability of the ERCOT grid.

Major Activities:

Regional Planning performs the following integral functions:

Coordination of the Regional Planning Group (RPG) process:

The RPG is an open stakeholder group that provides advice and comments on proposed transmission projects and transmission planning studies. Regional Planning facilitates a defined process for coordinating the review of transmission project proposals with the RPG. *See* ERCOT Protocols Section 3.11 for a more detailed description of the ERCOT regional planning process and the RPG.

Conduct ERCOT Independent Reviews:

As part of the RPG process, Regional Planning reviews proposed transmission projects that are subject to Certificate of Convenience and Necessity review at the PUCT, and projects that exceed $100 million in expected capital cost. This ERCOT Independent Review establishes the need for the proposed transmission project; that is, whether the project is needed to maintain future grid reliability, or whether it is expected to reduce overall future grid operating costs in an amount greater than the cost of the project to customers.

Study of grid stability limitations:

Electric power-flows on high voltage transmission can be subject to limits in order to ensure that the system maintains reliable, stable operations immediately following a significant system disturbance (e.g., a short-circuit or fault on the system, a lightning strike, or catastrophic loss of a transmission circuit or major substation equipment). These stability limitations are

becoming increasingly relevant as generation sources are developed further from major centers of customer demand, and as the number of inverter-based resources (such as wind generation, solar photovoltaic generation and battery resources) increases. Regional Planning conducts planning studies—some on an annual basis and some on an ad hoc basis—in order to ensure these stability limitations are appropriately identified, quantified and communicated to ERCOT Grid Operations and stakeholders.

Assessment of reliability impacts of proposed generation retirements:

Regional Planning is responsible for completing required grid reliability studies whenever ERCOT is notified by a generation resource owner that the resource owner intends to retire or mothball an operating generation unit.

Special Studies:

Transmission constraints that have a significant impact on grid reliability or the cost-effectiveness of grid operations sometimes warrant special ad hoc transmission planning studies. Current examples include:

- An assessment of the cost-effectiveness of transmission solutions to alleviate the West Texas Export stability constraint;
- An assessment of the need for new transmission to reliably serve growing oil and gas customer demand in the Delaware Basin region; and
- An assessment of the grid reliability need for additional import capacity into the Lower Rio Grande Valley.

Special studies are also conducted at the request of the PUCT. A recent example would be the PUCT-requested study to determine the preferred transmission solution to allow Lubbock Power & Light to transfer 70% of its customers into the ERCOT region.

Addressing Future Grid Reliability:

The Regional Planning group works to develop and assess new analytical tools, procedures, and processes to improve the assessment of future transmission needs. Because of the rapidly changing resource mix in the ERCOT region, Regional Planning must constantly work on improving the established planning methodologies to promote future grid reliability.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

The ERCOT Regional Planning team is recognized throughout the electric utility industry for its ability to thoughtfully assess future transmission needs, to identify cost-effective projects to meet these needs, and to innovate new analytical tools and procedures designed to decrease the time and cost associated with transmission planning studies.

By way of example, Regional Planning was responsible for developing the transmission plan for reliably integrating customers of Lubbock Power & Light into the ERCOT region. This plan was designed to minimize the cost of the new transmission circuits, while ensuring reliability for the new customers and maximizing overall system economic benefits for all customers in the ERCOT region. A detailed report of this study is available here.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

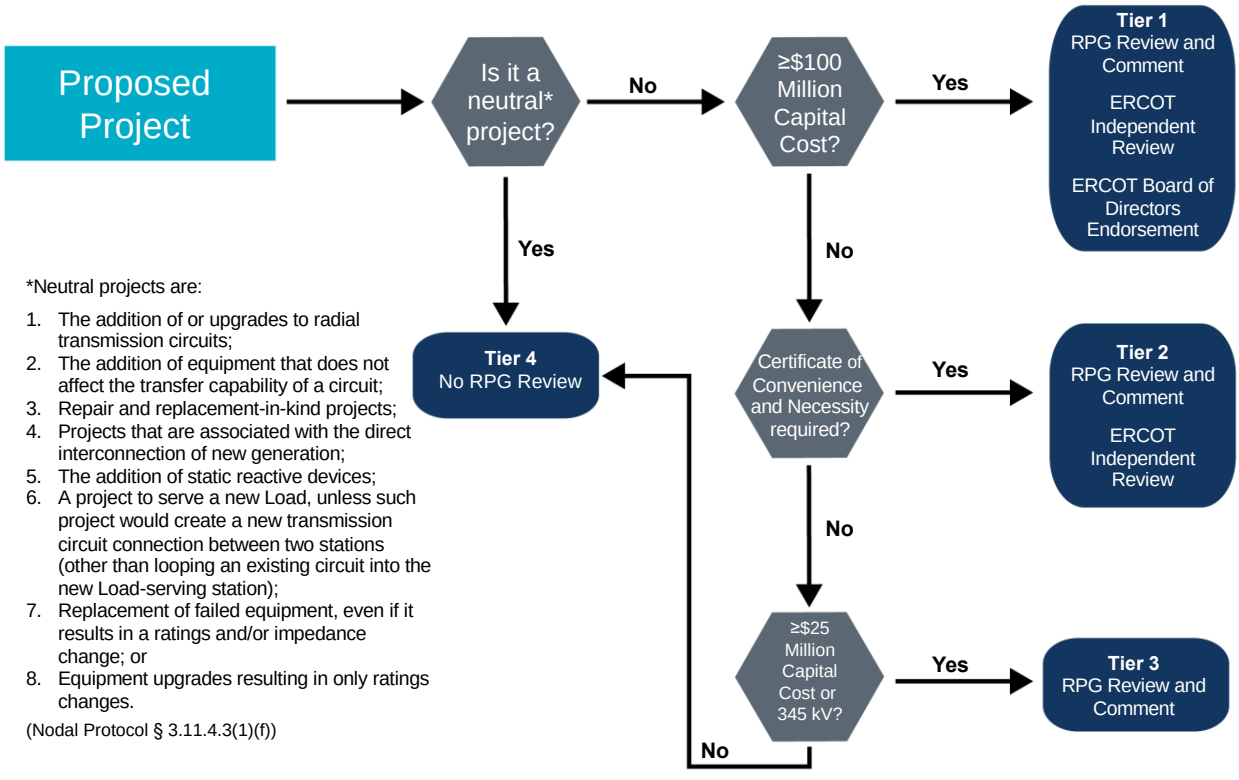
The ERCOT transmission planning process is a direct outgrowth of the restructuring of the electric utility industry. Prior to restructuring, much of the transmission planning activities were conducted by the individual, vertically integrated utilities. Although the functions of this program have remained largely the same, details of the processes have changed over time and been adapted to meet changing system conditions and the needs of customers.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Regional Planning addresses the reliability and cost-effectiveness of the ERCOT transmission grid, which affects the entire ERCOT market region.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The ERCOT Regional Planning Group process, managed by the Regional Planning program, is illustrated below. Projects requiring ERCOT Independent Review are assessed by Regional Planning.



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $3,036,980.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

ERCOT Transmission Planning Assessment conducts similar transmission planning activities. In contrast to the Regional Planning program, however, the Transmission Planning Assessment program focuses on annual and biennial studies required to meet NERC transmission planning standards, PUCT Substantive Rules, ERCOT Protocols and Planning Guides, and other state law.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Future transmission needs are typically identified initially through ERCOT Transmission Planning Assessment's annual assessments. Specific transmission projects to meet those needs are then assessed through the Regional Planning Group process (as coordinated by Regional Planning), and may be subject to ERCOT Independent Review (also conducted by Regional Planning). Additionally, Regional Planning conducts all transmission assessments that study grid stability issues.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Regional Planning obtains information and modeling tools through outside contracts, allowing the Regional Planning team to assess the impact of new resource technologies on grid reliability. Those contract expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to provide highly technical grid analytical tools, engineering analysis and training focused on the impacts of inverter-based resources (wind, solar generation and battery resources) on grid stability.
Vendor 2	This contract is to provide expert technical advisory services regarding the accurate assessment of impacts of new technologies on grid reliability.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $21,335.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information regarding ERCOT's transmission planning process and the Regional Planning Group may be found at: http://www.ercot.com/committee/rpg.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Transmission Planning Assessment**
Location/Division	Taylor / Grid Planning and Operations
Contact Name	Warren Lasher
Number of FTEs as of FY 2020	11
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objectives:

ERCOT Transmission Planning Assessment conducts annual and biennial transmission studies designed to meet the requirements set forth under the North American Electric Reliability Corporation (NERC) Reliability Standards, ERCOT Protocols and Planning Guides, PUCT Substantive Rules, and state law.

Major Activities:

The primary functions of this program include:

Completion of the annual Regional Transmission Plan (RTP), requiring that the Transmission Planning Assessment team:

- evaluate the need for additional transmission capacity throughout the ERCOT interconnection within a six-year planning horizon;
- propose transmission projects to meet these identified system needs;
- coordinate and communicate with transmission owners to identify system needs and the feasibility of potential solutions;
- evaluate economic projects that reduce overall grid operating costs sufficiently to cover the expected cost of the transmission project for customers;
- perform analyses in compliance with the transmission planning requirements and other applicable requirements of NERC and the ERCOT Protocols and Planning Guides;
- update stakeholders on the status and findings of the RTP at monthly Regional Planning Group meetings;
- evaluate short-circuit current levels across the system; and

- evaluate the potential for multiple transmission circuit outages resulting from one event (circuit cascade analysis).

Complete the biennial Long-Term System Assessment, requiring that the Transmission Planning Assessment team:

- evaluate long-term system needs (over 10-to 15-year planning horizons) using a set of potential future scenarios designed to bookend potential future outcomes;

- develop scenarios in coordination with stakeholders;

- develop likely generation expansion for each scenario alongside the ERCOT Resource Adequacy program; and

- for each future scenario, evaluate regional transmission needs, with a focus on how the identified transmission solutions diverge and converge across the different scenarios.

This long-term planning process informs near-term planning in the Regional Transmission Plan by identifying the types of transmission projects that are consistent with expected long-term system needs; and by allowing transmission planners to evaluate new tools and processes to improve the process of identifying transmission projects.

Geomagnetic Disturbance evaluation: The Transmission Planning Assessment program analyzes and publishes the potential impacts of Geomagnetic Disturbances on the ERCOT grid in compliance with NERC requirements.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Transmission Planning Assessment is frequently audited by NERC staff and by the Texas Reliability Entity (the NERC Regional Entity) and is consistently found to be compliant with the applicable NERC planning standards.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The ERCOT transmission planning process is a direct outgrowth of the restructuring of the electric utility industry. Prior to restructuring, much of the transmission planning activities were conducted by the individual vertically integrated utilities. Although the functions of this program have remained largely the same, details of the processes have changed over time and been adapted to meet changing system conditions and the needs of customers.

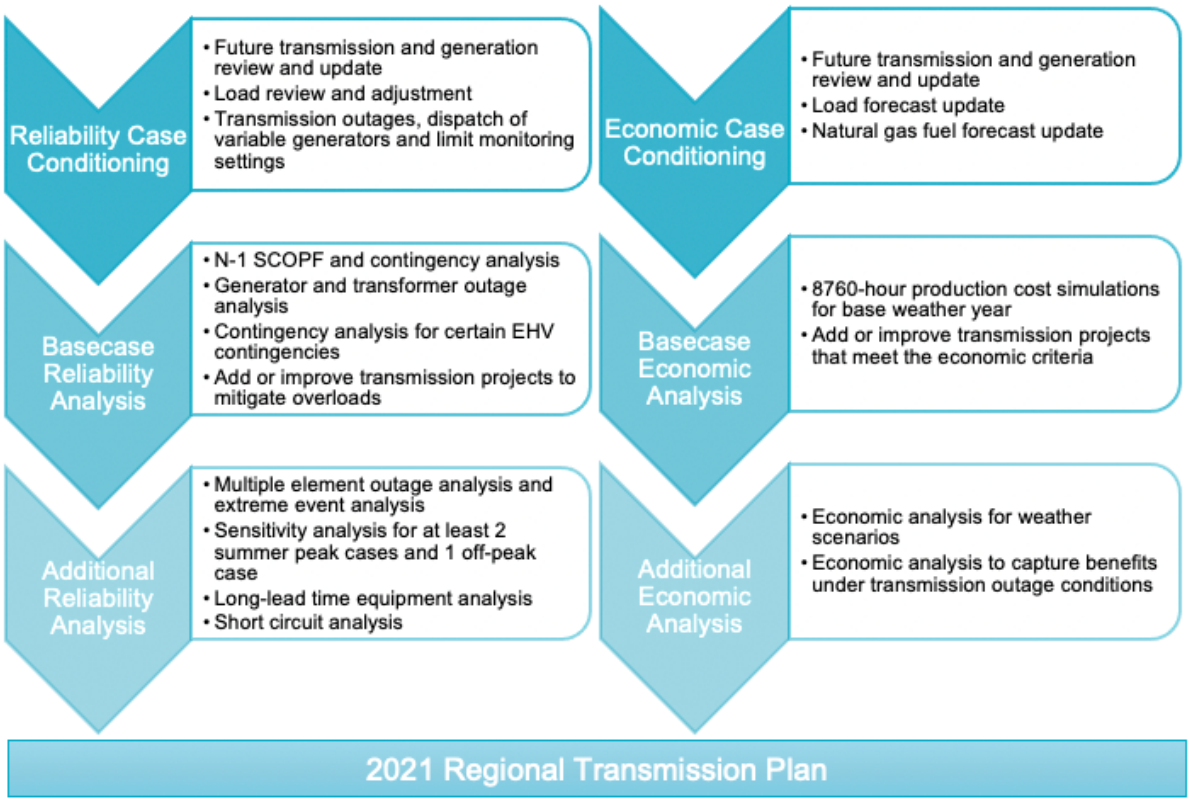
E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The reliability and cost-effectiveness of the ERCOT transmission grid – ensured by the functions of this program – affects virtually every person and entity located within the ERCOT region.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Transmission Planning Assessment's primary role is completing the annual Regional Transmission Plan and the biennial Long Term System Assessment and, through these studies, maintaining compliance with applicable NERC reliability standards and with ERCOT Protocols. The manager of Transmission Planning Assessment is responsible for allocating staff appropriately to ensure that these studies are completed in a timely manner.

A high-level overview of the Regional Transmission Plan process is provided in the following chart:



G. Identify all funding sources and amounts for the program or function.

The Transmission Planning Assessment program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,751,007.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

The Regional Planning program conducts similar transmission planning activities. In contrast to the Transmission Planning Assessment program, however, Regional Planning focuses on project-specific studies designed to identify the most cost-effective project solutions for specific identified future transmission needs, evaluated based on estimated cost and overall effectiveness.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Typically, future transmission needs are initially identified through the annual assessments conducted by ERCOT Transmission Planning Assessment. Specific transmission projects meeting these identified needs are then assessed through the Regional Planning Group process (as coordinated by the Regional Planning program), and Regional Planning will conduct any necessary ERCOT Independent Review of these proposed transmission projects.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Regional Planning Group membership is widely open to those with an interest in the transmission planning activities in the ERCOT region, including Market Participants, customer groups, environmental groups, landowners, government officials, and PUCT staff.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Transmission Planning Assessment outside service costs are attributable to contract engineering staff, which provided additional engineering analytical capability. This allowed the program to develop new processes to satisfy new NERC requirements concerning studying the impacts of geomagnetic disturbances of grid reliability. These expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to provide additional temporary contract engineering staff.

Procurement/Accountability: ERCOT's procurement and human resources departments coordinate these services and ensure accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems with this vendor.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information regarding ERCOT's transmission planning process and the Regional Planning Group may be found at: http://www.ercot.com/committee/rpg.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Resource Adequacy**
Location/Division	Taylor / Grid Planning and Operations
Contact Name	Warren Lasher
Number of FTEs as of FY 2020	6
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The ERCOT Resource Adequacy team tracks the status of current and future resources in the ERCOT region and publishes a variety of reports and studies that inform the public, stakeholders, state regulatory personnel, and the North American Electric Reliability Corporation (NERC) about resource adequacy in the ERCOT region.

Major Activities:

Resource Adequacy is responsible for:

- the biannual publication of the Capacity, Demand, and Reserves report, which provide a snapshot of available information regarding existing and potential future generating plants and expected peak customer demand in the ERCOT region for the next 10 years;
- the quarterly publication of the Seasonal Assessment of Resource Adequacy (SARA), which provides a view of likely peak-demand operational resource adequacy for the upcoming season;
- completing resource adequacy reports and studies required by the NERC;
- developing and maintaining database query tools necessary to extract resource adequacy data from operational databases and from resource information databases;
- analyzing expected future generation development for long-term (15 years) future scenarios, completed in support of the development of the Long-Term System Assessment by ERCOT Transmission Planning Assessment;
- working with stakeholders and regulatory staff to pursue improvements in methodologies used to complete resource adequacy assessment, and to incorporate improved understanding of resource capability and changing conditions on the ERCOT grid into these assessments;

- participating in NERC working groups on resource adequacy and the impact of new technologies;

- evaluating expected generation output from wind and solar generation units in different weather conditions;

- completing analyses of the grid impacts resulting from different levels of reserve margins (the amount of extra, expected operational generation capacity above expected annual peak customer demand);

- analyzing the impact of continued development of new technologies (for example, wind generation, solar generation, battery storage resources, and resources installed on electric distribution circuits) on ERCOT planning studies and ERCOT grid operations;

- completing monthly reports that provide an assessment of historical customer demand and generation unit output, and provide an update on the status of proposed resources in the interconnection process; and

- completing monthly assessments of the status of drought conditions across the ERCOT region and potential impacts within the next 18 months on thermal generation units.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Reports produced by Resource Adequacy are heavily scrutinized by Market Participants, by state regulatory personnel, and by NERC. All reports have been provided in a timely and complete manner and are regarded as being highly accurate and informative.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The ERCOT Resource Adequacy reporting function is a direct outgrowth of the restructuring of the electric utility industry as both grid operations and grid transmission planning were centralized within ERCOT. Prior to restructuring, the individual vertically integrated utilities were required to analyze resource adequacy in their regions, and to propose new resources when needed. Details of the Resource Adequacy reporting process have changed over time and have been adapted to meet changing system conditions and the needs of stakeholders and regulatory personnel.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The adequacy of grid resources affects every Market Participant and electricity customer in the ERCOT region. Timely and accurate information regarding the status of resources is a critical data point for Market Participants making decisions regarding investing in new resources, purchasing power contracts, and hedging power price risks. Further, discussions at the PUCT and at the Texas Legislature regarding the need for improvements to the wholesale electricity market design in the ERCOT region rely on the accuracy of this information.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The Resource Adequacy program has a defined list of reports that are required to be completed on a specific timeline by NERC (Long-Term Reliability Assessment, Summer Seasonal Assessment, Winter Seasonal Assessment); PUCT Substantive Rules (Capacity, Demand and Reserves report); and ERCOT Protocols (ERCOT Demand and Energy report, ERCOT Monthly Generator Interconnection Status report). In addition, there are a set of reports that the Resource Adequacy prepares and publishes on a schedule that has been established through discussions with Market Participants and regulators (the quarterly Seasonal Assessments of Resource Adequacy). The manager of Resource Adequacy is responsible for assigning staff appropriately so that these reports are developed, reviewed, and released in a timely manner. The manager is also responsible for managing studies on an annual basis that evaluate the relationship between system reserve margin (i.e., the adequacy of resource to serve peak customer demand) and the potential for emergency operating conditions throughout the year.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,211,136.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Resource Adequacy relies on information provided by outside consultants regarding the potential output of future wind and solar generation units. Resource Adequacy also contracts with vendors who supply complex grid simulation models. These expenditures are summarized as follows:

Contract Expenditures Summary	
Vendor 1	This contract is to provide engineering support, software and training focused on tools that allow assessment of the relationship of grid reliability and different levels of reserve margin.
Vendor 2	This contract is to provide complex modeling services to create simulated hourly output patterns for wind and solar generation based on historical weather data. These hourly generation patterns are used to incorporate wind and solar generation in studies designed to assess the impact of variable generation on grid resource adequacy and on the economic benefits of new transmission projects.
Vendor 3	This contract is to provide specific market data required to develop forecasts of fuel costs and develop future scenarios for long-term transmission planning studies.
Vendor 4	This contract is to provide software that assesses potential cost effectiveness of various generation technologies and develops future scenarios for long-term transmission planning studies.
Vendor 5	This contract is to provide software that allows the creation of sub-hourly representations of the output of wind and solar units using data that is available by hour.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $396,313.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Load Forecast and Analysis**
Location/Division	Taylor / Grid Planning and Operations
Contact Name	Jeff Billo
Number of FTEs as of FY 2020	6
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The objective of Load Forecasting and Analysis is to provide ERCOT system planners with a long-term demand forecast and to provide ERCOT System Operators with a near-term forecast of demand. System planners use the long-term demand forecast so that adequate infrastructure is planned for grid reliability in the future. System Operators use the near-term demand forecast to promote adequate reliability of the grid on a minute-to-minute and day-to-day basis.

Major Activities:

Long-term load forecasting:

The Long-Term Load Forecasting application uses historic observations and econometric projections to forecast system demand one to fifteen years into the future. The ERCOT system is divided into eight weather zones, pictured below, and forecasts are produced for each of these zones.

Additionally, forecasts are produced for various weather scenarios to provide system planners with multiple scenarios to study. The Long-Term Load Forecast is also used for ERCOT revenue projections for budget planning purposes.

Near-term load forecasting:

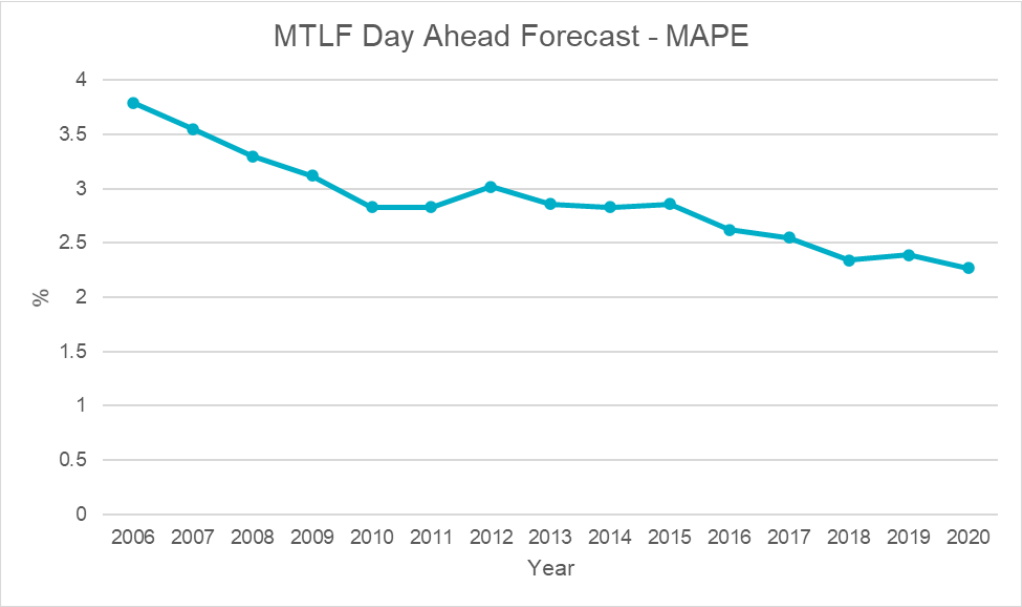
Near-term load forecasting is comprised of two applications: the Mid-Term Load Forecast and Short-Term Load Forecast. The Mid-Term Load Forecast is produced every hour for the upcoming seven-day period. This forecast is used by System Operators in various activities related to daily grid reliability monitoring and in the ERCOT outage coordination process so that the planned outage of equipment is conducted in a reliable manner. The Short-Term Load Forecast is produced every five minutes for the upcoming two hours, and is used by System Operators in various activities of grid reliability monitoring. Both forecasting applications produce forecasts for each of the eight weather zones.

ERCOT receives five distinct weather forecasts from two vendors, and an analyst determines which of these forecasts to use for the near-term load forecasting applications. ERCOT uses the weather forecasts to create seven different load forecasts for the Mid-Term Load Forecast application. These forecasts consist of: four ERCOT-developed and maintained forecast models; two vendor supplied forecast models; and one model that averages several of the forecasts. Each of these models uses a different combination of weather variables and forecasting algorithms to produce the load forecast. A System Operator, in consultation with a forecasting analyst, selects which of the forecasts to use for a given day.

Additionally, an on-staff meteorologist provides weather forecast support to System Operators and provides daily and seasonal forecasts to various ERCOT programs and to stakeholders through the ERCOT website.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

The chart below shows the improvement in the Mid-Term Load Forecast (MTLF) from 2006 through 2020. The Mean Absolute Error (MAPE) in day-ahead load forecasts is shown as the blue line; it has decreased by almost 50% (from just under 4% to slightly over 2%) since 2006.



D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

In 2009, an integrated load forecasting team was formed. Previously, the operational load forecasts and planning forecasts were performed on separate teams. Load forecasting performance has continued to improve over time since the new combined program was formed. Having a single program focus on load forecasting has also increased operational efficiency, as it allows one set of analysts to address all load forecasting needs, requiring fewer full-time employees compared to when these tasks were spread across separate programs.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

System planners use the long-term demand forecast so that adequate infrastructure is planned for grid reliability in the future. System Operators use the near-term demand forecast to promote adequate reliability of the grid on a minute-to-minute and day-to-day basis. Because the ERCOT systems use these forecasts to schedule resources and reserves to meet the projected demand, the functions of this program affect every electricity customer and Market Participant in the ERCOT region.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The program is administered by a manager and five full-time employees.

Annually, the Long-Term Load Forecast application process is updated to include the latest econometric and historical information. Once an hour, forecasted meteorological data is received by the near-term load forecast applications. Using this data and archived observation data, the application produces hourly forecasts for each weather zone for the rest of the current day and next six days. Daily, the in-house meteorologist reviews weather forecast information and provides assessments for various internal and external stakeholders.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,165,556.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region, though some Market Participants may have load forecasting and/or meteorologist support within their companies.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

The Load Forecasting and Analysis program contracts with vendors to provide weather forecasting and economic forecasting services. These expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to provide weather forecasts and raw weather model forecasts (Euro, GFS, GENS) used in operational load forecasts, long-term load forecasts, and other internal analyses.
Vendor 2	This contract is to provide economic forecasts used in long-term load forecasts and for other internal analyses.
Vendor 3	This contract is to provide forecasting software support.
Vendor 4	This contract is to provide weather forecasts used in operational load forecasts.
Vendor 5	This contract is to provide weather data.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $258,928.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Operations Analysis**
Location/Division	Taylor / Grid Planning and Operations
Contact Name	Jeff Billo
Number of FTEs as of FY 2020	8
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The objectives of the Operations Analysis program are to:

- determine the Ancillary Services needed for maintaining grid reliability;
- qualify resources to provide Ancillary Services;
- evaluate the system response to grid frequency deviations;
- serve as subject matter experts for Energy Management System (EMS) tools that are used to monitor frequency and deploy Ancillary Services;
- ensure compliance with related NERC Reliability Standards;
- administer ERCOT's wind and solar integration program with a focus on forecasting for system operators to maintain grid reliability;
- coordinate with wind and solar forecast vendors to enable continued improvements in forecasting;
- conduct post event analysis to understand underlying causes for system events and recommend changes; and
- conduct weatherization spot checks.

Major Activities:

Determining Ancillary Services needed:

Ancillary services may be defined generally as those services necessary to support the transmission of energy to Loads while maintaining reliable operation of the transmission system

using Good Utility Practice. Ancillary Services quantities are calculated on an annual basis using historical data to evaluate ERCOT system needs and are updated monthly as needed. The calculation is performed pursuant to the process outlined in the document "Methodology used for determining Ancillary Services." The document is reviewed annually by ERCOT staff, including the Operations Analysis team, and stakeholders; changes are approved by the ERCOT Board.

Qualifying Resources to provide Ancillary Services:

Operations Analysis makes determinations regarding which generators are qualified to provide Ancillary Services; monitors Resources' performance during Ancillary Service deployments to ensure they meet expectations established in ERCOT Protocols; and supports generator operators to address any issues encountered in the operation of their plants.

Evaluating system response to grid frequency deviations:

The Operations Analysis program includes monitoring of relatively small deviations in system frequency, which are caused by the imbalance between load and generation. Part of this monitoring includes calculating performance metrics in accordance with NERC BAL Reliability Standards (reliability requirements that pertain to resource and demand balancing), monitoring grid inertia, and conducting studies that establish ERCOT's Critical Inertia system operating limit. If metrics trend in an unfavorable direction, ERCOT can tune Energy Management System tools that are used to monitor frequency, deploy Ancillary Services, and procure more Ancillary Services.

Operations Analysis also evaluates the performance of generation resources and energy storage resources for relatively large deviations in system frequency, typically caused by a large generator tripping out of service. ERCOT works with stakeholders to improve generator response to these types of events to promote grid reliability.

Wind and solar forecasting:

The Operations Analysis program works with two vendors that provide ERCOT with forecasts for wind generation, and one vendor that provides ERCOT a forecast for solar generation. These forecasts are provided for each wind generator and solar generator on the ERCOT system for each hour of the next seven days. ERCOT also receives a five-minute intra-hour forecast for wind and solar generation for the upcoming two hours. The Operations Analysis program advises System Operators on the best wind forecast to select and works with the wind and solar vendors to improve forecast accuracy. This information is necessary for System Operators so that they have sufficient dispatchable generation available to meet system needs.

Conducting post-event analyses:

The Operations Analysis team conducts post-event analyses to understand underlying causes for system events, develop any Lessons Learned and recommend system changes to reduce operational risks and improve situational awareness in the Control Center.

Serving as subject matter experts:

The Operations Analysis team also serves as subject matter experts for developing tools that monitor wind and solar forecasts; monitor the sufficiency of procured Responsive Reserve Ancillary Service; and assess the sufficiency of available non-renewable generation and procured Regulation and Non-Spin Ancillary Services in serving forecasted net load and associated uncertainty.

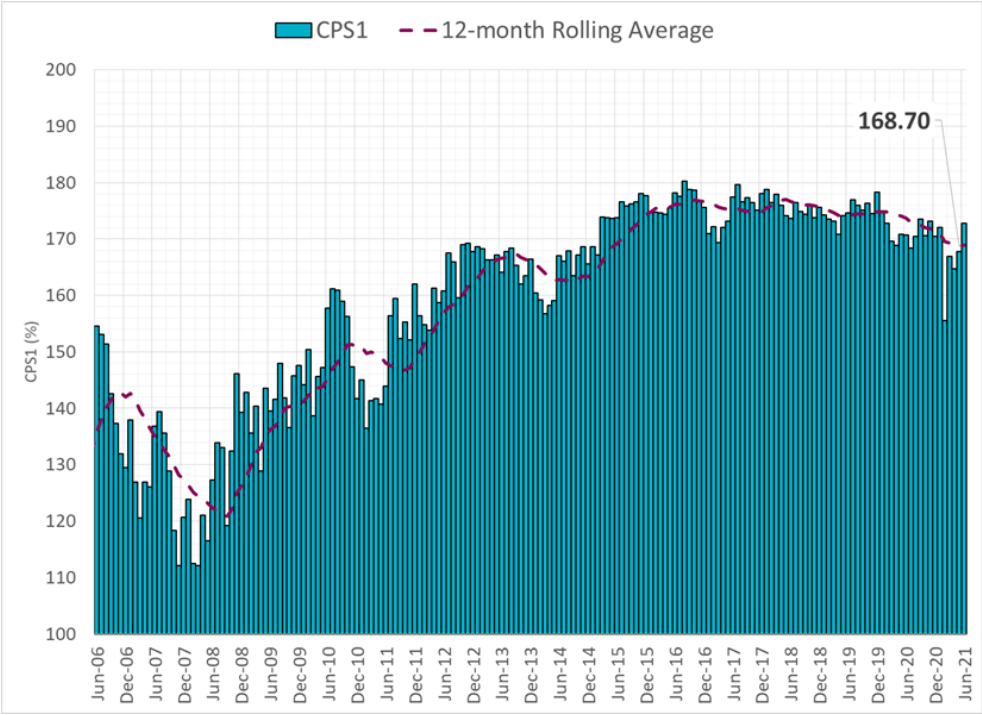
Performing weatherization checks:

The Operations Analysis program responsibilities include performing spot checks of generators so that they are implementing best practices and are prepared for winter and summer weather conditions.

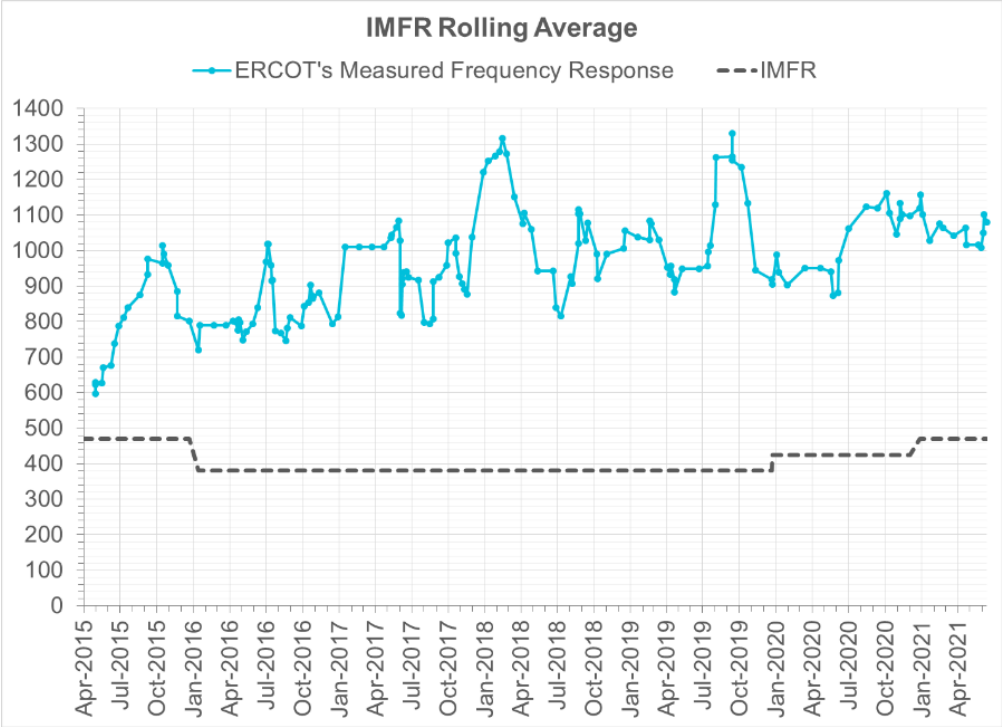
C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

NERC's Control Performance Standard (CPS) BAL-001-0.1a has instituted performance metrics CPS1 and CPS2 to be used as an indicator of sufficiency of a Balancing Authority's – e.g., ERCOT's – frequency control. The minimum acceptable long-term score for CPS1 is 100%; a score of 200% would indicate perfect long-term control. The figure below shows ERCOT's monthly CPS1 performance scores through the month of June 2021.

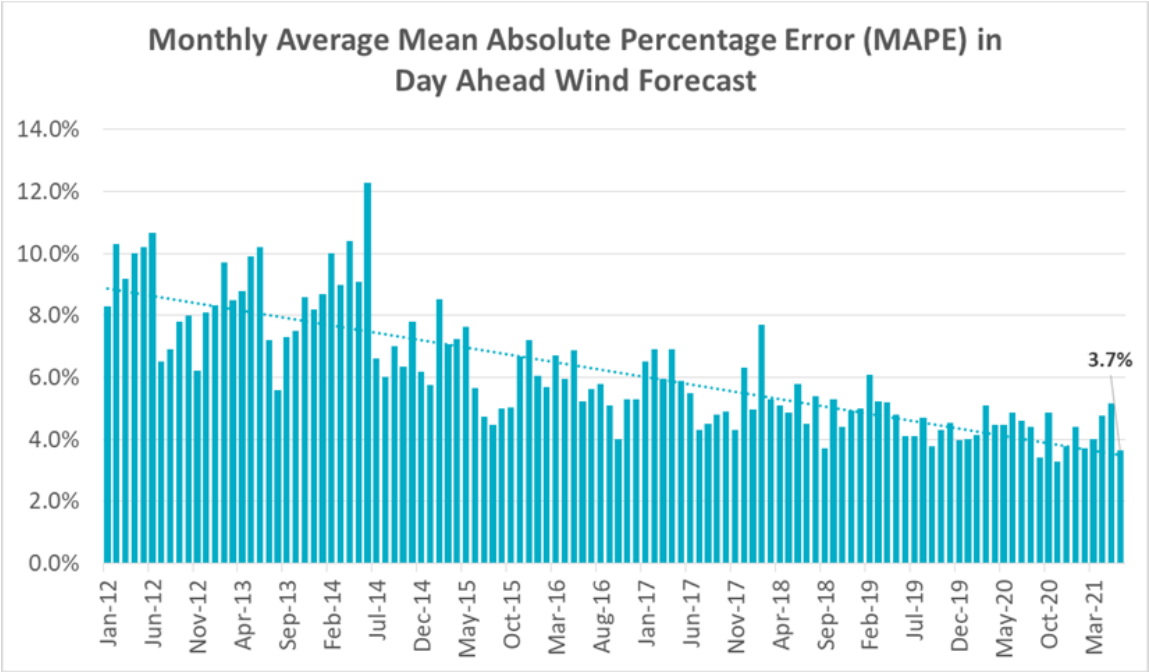
ERCOT's 12-month rolling average CPS1 score is 168.70—the best CPS1 score in all of North America. ERCOT is exempt from CPS2 performance monitoring.



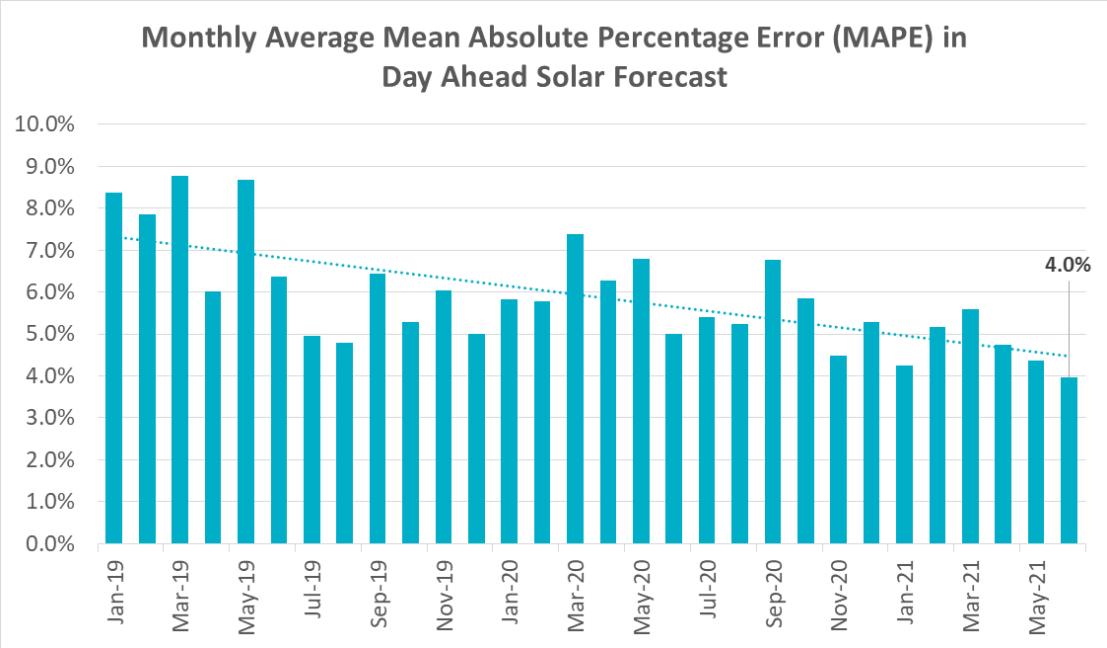
The next figure depicts ERCOT's measured frequency response during Frequency Measurable Events, as measured since institution of the NERC BAL-001-TRE standard in April 2015. ERCOT has stayed well above ERCOT's applicable Interconnection Minimum Frequency Response (IMFR).



Since implementing a centralized forecasting service for wind generation in 2009 and for solar generation in 2016, the Operations Analysis team has worked with all wind and solar forecast vendors to improve performance of the forecasts that are sent to ERCOT. The figure below illustrates the monthly average performance of the Day-Ahead Wind forecast represented as a Mean Absolute Percentage Error (MAPE). As seen below, ERCOT's Day-Ahead MAPE for wind forecast has steadily decreased over time. The MAPE for the month of June 2021 is 3.7%—well within the stretch goal (8%) for this Key Performance Indicator.



Similarly, the figure below demonstrates the monthly average performance of the Day-Ahead solar forecast. ERCOT's Day-Ahead MAPE for solar forecast for the month of June 2021 is 4.0%—also well within the stretch goal (10%) for this Key Performance Indicator.



D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

Most of the activities in the Operations Analysis program have been in place since ERCOT took over singular control of the Texas Interconnection in 2001. The program implemented a centralized forecast for wind in 2009 and for solar in 2016. Generator weatherization spot checks began in 2011.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

This program primarily impacts ERCOT System Operators, who make use of Ancillary Services to maintain grid reliability. System Operators also use the wind and solar forecasts to determine the amount of dispatchable resources needed to meet system demand at all times.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The program is administered by a manager, a supervisor and six full-time employees. Its functions are performed as follows:

Action	Frequency
Review and update Ancillary Services Methodology	Annually, consultation from stakeholders and approval by the ERCOT Board.
Assess generators' qualifications to provide Ancillary Services	Performed per the process outlined in ERCOT Protocols on an as-requested basis
Monitors system response to small frequency deviations	On a monthly basis
Monitors system response to large disturbances	On an as-needed basis
Tune EMS's frequency monitoring	On an as-needed basis
Tune Ancillary Services deployment tools	On an as-needed basis
Evaluation of generation resource's ability to meet expectations	On an ongoing basis
Analysis of system events	On an as-needed basis
Receipt of wind and solar forecasts	In an automated fashion
Monitoring of wind and solar forecasts	On a daily basis
Generator weatherization spot checks	On a seasonal basis

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,603,800.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Operations Analysis contracts for data subscription services for wind and solar forecasts from three vendors. These expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to provide to provide wind forecast services
Vendor 2	This contract is to provide to provide solar forecast services.
Vendor 3	This contract is to provide wind forecast services.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $376,614.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws?

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Resource Integration**
Location/Division	Taylor / Grid Coordination
Contact Name	Bill Blevins
Number of FTEs as of FY 2020	10
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Resource Integration manages the process to interconnect generation to the ERCOT system in accordance with Planning Guide Section 5 (Generation Resource Interconnection or Change Request) and PUCT Substantive Rule 25.198. Resource Integration is responsible for tracking each generator through the stages of the interconnection process; facilitating interactions between ERCOT, Transmission Services Providers, and Resource Entities; and resolving any issues that may arise during this process.

Major Activities:

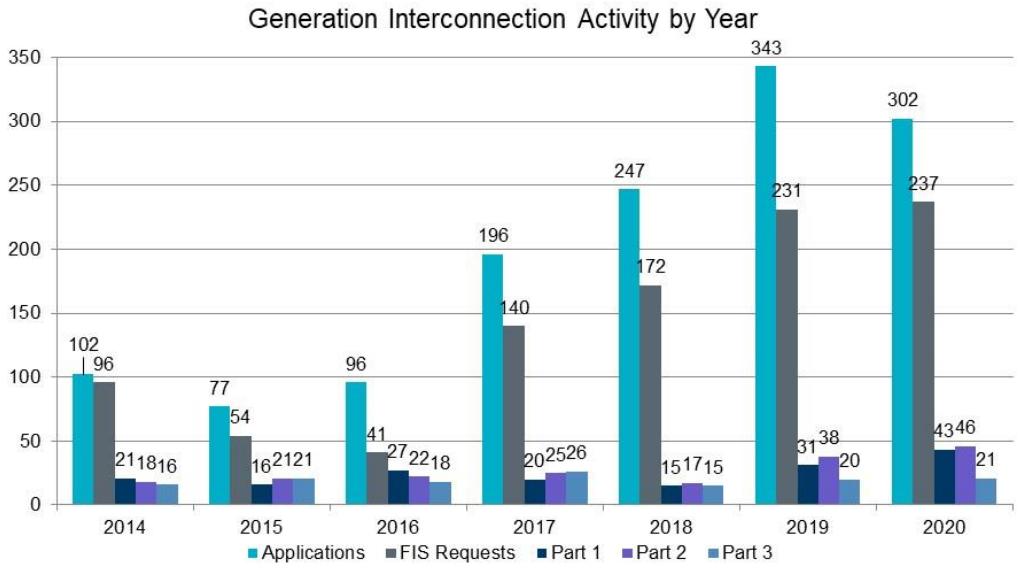
Resource Integration performs the following major activities:

- approves Generation Interconnection Request (GINR) applications;
- conducts Security Screening Studies;
- evaluates Full Interconnection Study (FIS) applications;
- reviews Transmission Service Provider (TSP) conducted FIS studies;
- conducts Quarterly Stability Analysis (QSA) assessments;
- approves resource asset registrations; and
- approves of energization, synchronization and commissioning checklists.

The generator interconnection process is described further in the Resource Interconnection Handbook.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function.

As pictured below, the Resource Integration program has successfully managed hundreds of interconnection applications since 2017.



D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

This program has existed in some form since 1997 in order to facilitate open access to the transmission system. The scope of the program has increased over the years to include the planning work (Stage 1 in the Resource Integration Handbook, linked above), modeling work (Stage 2), and commissioning (Stage 3), which were originally performed by three different programs. In 2017, the three-stage process was consolidated into Resource Integration, allowing Resource Integration engineers to follow interconnection requests from application through commissioning.

In August 2018, an online application called Resource Integration and On-Going Operations – Interconnect Services (RIOO-IS) was created internally by ERCOT business and software development. This software allows ERCOT and Interconnecting Entities, Resource Entities, and Transmission Service Providers to access the same interconnection database while restricting access to each entity type based on confidentiality rules. These entities are allowed to see and enter required data and to attach documents to be used during the interconnection process.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The following entities are impacted by the Resource Integration program:

- **Interconnecting Entities:** includes any entity that has submitted a Generation Interconnection or Change Request Application for a Generation Resource or Settlement Only

Generator and meets the requirements of Planning Guide Section 5.1.1. Near the end of the interconnection process, most of these IEs will become Resource Entities (RE). During the interconnection process, the ERCOT Resource Integration program is the primary contact for an Interconnecting Entity.

- **Transmission Service Providers:** includes entities under the PUCT's jurisdiction that own or operate transmission facilities used for the transmission of electricity. Roughly 78% of interconnection applications proceed to full interconnection studies performed by TSPs.

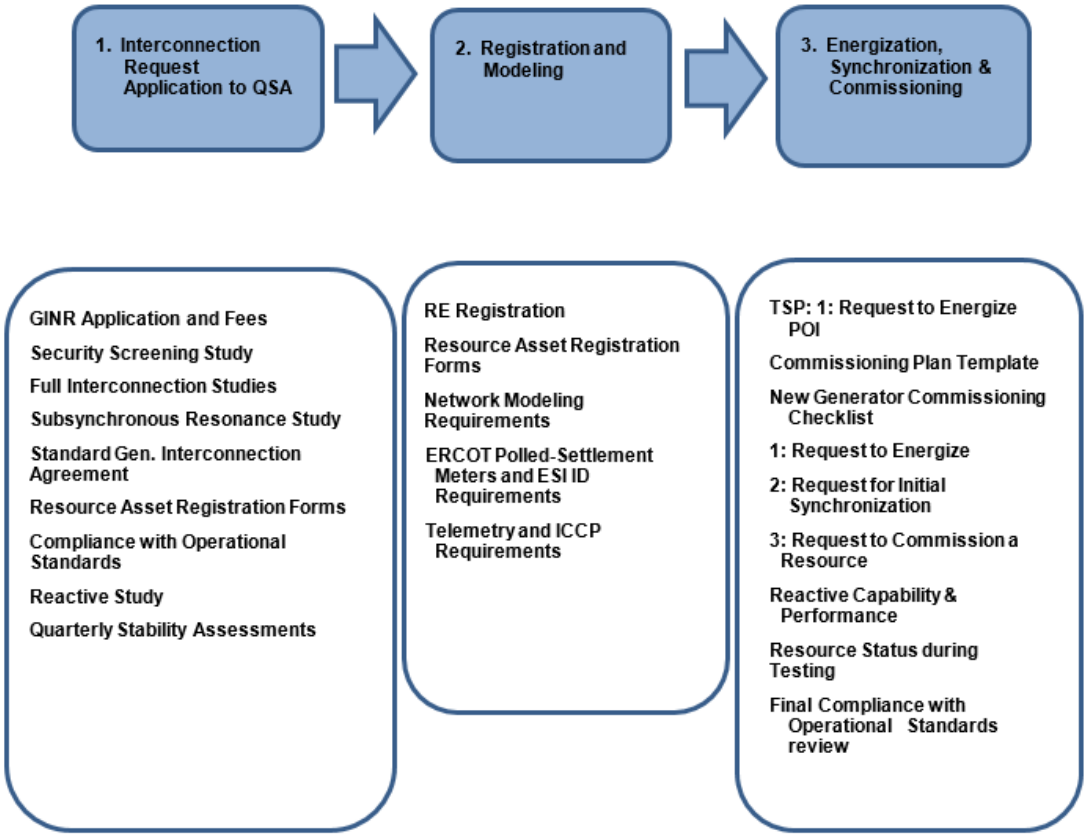
- **Resource Entities:** includes entities that own or control a Generation Resource, a Settlement Only Generator, or a Load Resource and is registered with ERCOT as a Resource Entity. Roughly 14% of interconnection applications proceed to energization in a given year (see Generation Resource Interconnection Process Flow, below).

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Resource Integration is administered by a manager and two supervisors.

The interconnection process managed by this program is illustrated below:

Figure 1: Generation Resource Interconnection Process Flow



G. Identify all funding sources and amounts for the program or function.

This program is funded in part by the ERCOT System Administration Fee. ERCOT also charges the following fees for the work it does during the interconnection process:

- **ERCOT Generation Interconnection fee** – for an application to interconnect generation:
  - $5,000 (less than or equal to 150MW)
  - $7,000 (greater than 150MW)

- **Full Interconnection Study Application fee** - $15 per MW to support ERCOT system studies and coordination.

Budgeted expenditures for Fiscal Year 2021 total $1,998,324.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Resource Integration outside service costs are attributable to contract engineering staff. These expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to provide additional temporary contract engineering staff.

Procurement/Accountability: ERCOT's procurement and human resources departments coordinate these services and ensure accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There has been a dramatic increase in the number of interconnection requests, and budgeting and staffing for Resource Integration is difficult to fit into the normal budget cycle process. New equipment, such as inverter bases resources, causes studies to be more complex, such as subsynchronous resonance and dynamic stability, and changes to ERCOT processes and rules may lag industry adoption.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information is available at http://www.ercot.com/services/rq/integration.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Engineer Development Program**
Location/Division	Taylor / Grid Coordination
Contact Name	Bill Blevins
Number of FTEs as of FY 2020	9
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Engineer Development Program (EDP) is an intensive 12-16 month program for new engineers beginning their career in the industry. The objective of the EDP is to develop essential power engineering skills and a core base of knowledge about the roles of each engineering group at ERCOT. Upon graduation from the program, EDP Engineers are placed in one of the engineering departments as a full-time engineer.

Major Activities:

The EDP combines real, daily engineering work with a curriculum that gives participants the skills necessary to be successful in their careers. To complete the program, an EDP Engineer must demonstrate proficiency with a core set of skills (known as competencies), complete the department modules (extended visits to each of the engineering groups), and finish a long-term technical project. While progressing through these requirements, the EDP Engineer is based in the Network Modeling group and performs day-to-day work as a member of this team.

These tasks are further explained below:

- **Competencies:** EDP Engineers attend a variety of training courses, including the annual ERCOT Black Start Training and Operator Training Seminars; training on ERCOT-related software applications; and Lunch-and-Learn short courses. In addition, interested EDP Engineers receive support preparing for and passing the Fundamentals in Engineering Exam (which is generally the first step in the process to becoming a professional, licensed engineer) and NERC exams. All available training opportunities are selected to foster professional growth and best prepare EDP Engineers for their future careers.

- **Department Modules:** Department Modules are extended visits to each of the engineering groups at ERCOT. Each module is designed by subject matter experts to give the EDP Engineer an understanding of the work performed by each engineering group, and how the group contributes to ERCOT's mission. A module lasts approximately two to four

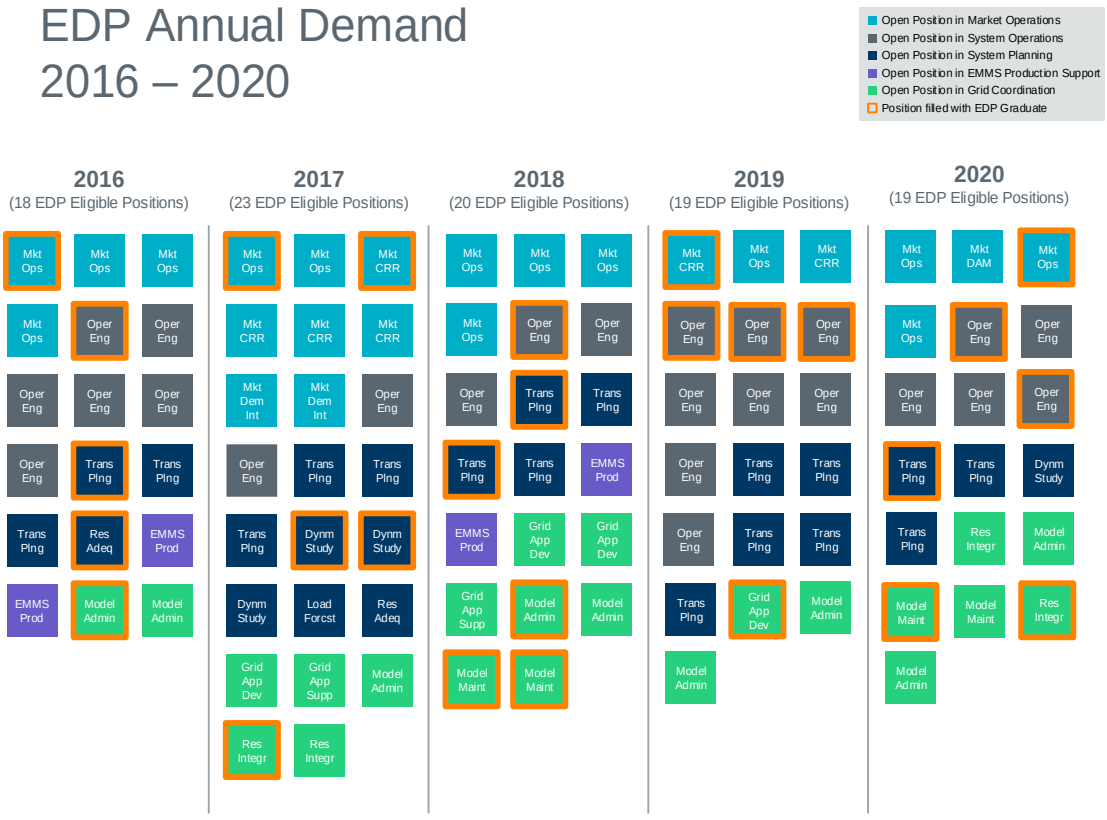
weeks, depending on the size of the group. The EDP Engineer will perform some of that group's day-to-day tasks and may be assigned additional work to solidify understanding of the group's responsibilities.

- **Long-Term Technical Project:** As the program progresses, each EDP Engineer completes a long-term technical project. These projects are proposed by the managers of the engineering departments, and the EDP Engineer selects one that fits his or her interests. Technical projects go beyond the scope of the Department Modules or intern-level work, giving the EDP Engineer a chance to dig deeply into a topic while providing a real, lasting benefit to ERCOT.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

As of December 2020, the program has graduated 39 EDPs, 31 of which are still working at ERCOT, and which generally offer greater value to the organization than external entry-level hires. Some of the earliest graduates are now gaining seniority and moving into leadership roles. The current supervisor of the EDP, Luis Hinojosa, was the 3rd EDP to graduate from the program, demonstrating the program's ability to develop engineers to be successful at ERCOT.

Below is a chart that shows the available EDP positions available and the ones that were filled by a graduating EDP from 2016-2020.



D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The founding objective of the EDP was to develop essential power engineering skills and a core base of knowledge about the roles of each engineering group at ERCOT. The expectation was to train these engineers so they are successful engineers in the industry. These engineers would fill open positions at ERCOT with the necessary skills to fulfill all responsibilities, which would limit the amount of training each individual engineering group would need to provide.

The program was launched with three engineers in September 2012 and was quickly ramped up to six engineers shortly after. The overall structure of the program has remained the same, with some modifications to the day-to-day tasks of the EDPs to account for new responsibilities of each engineering group. Over the years, the program has had five supervisors leading the program, each making their own additions/modifications to the program to help support the success of the team.

One notable recent change was increasing the FTEs from six engineers to eight engineers for 2019 and 2020. This was done to accommodate additional work coming to ERCOT with the Passport Program. The Passport Program was expected to bring additional openings in several of the engineering groups. More details on the Passport Program can be found on page 157.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The EDP affects multiple groups within ERCOT. Below is the list of groups that EDP works with by completing competencies, modules, or projects. These are the same groups that will likely have a graduating EDP placed.

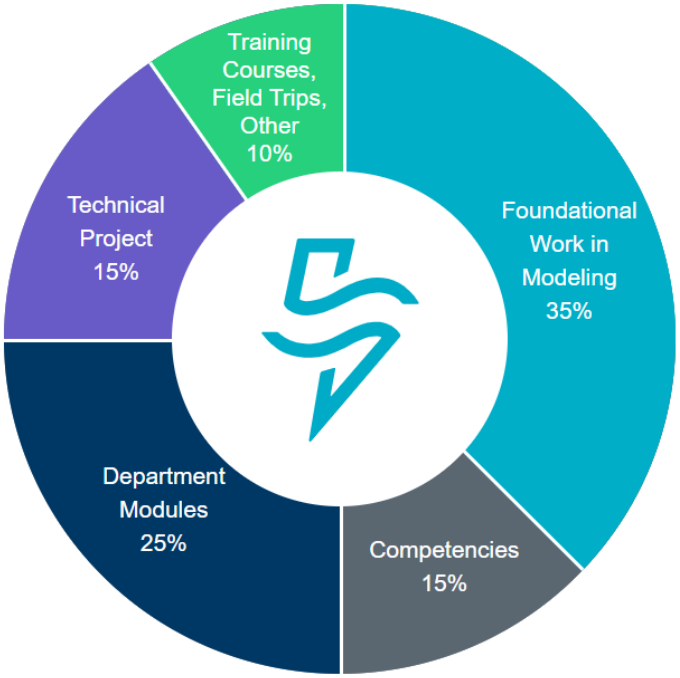
- Network Model Administration
- Network Model Maintenance
- Grid and Market Solutions
- Transmission Planning
- Resource Integration
- Resource Adequacy
- Long-Term System Assessment
- Dynamic Studies
- Congestion Revenue Rights
- Day-Ahead Market
- Settlement Metering
- Real-Time Operations
- Outage Coordination
- Operations Analysis
- Operators Training

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The program is administered by a supervisor who reports to the director, and eight additional full-time employees.

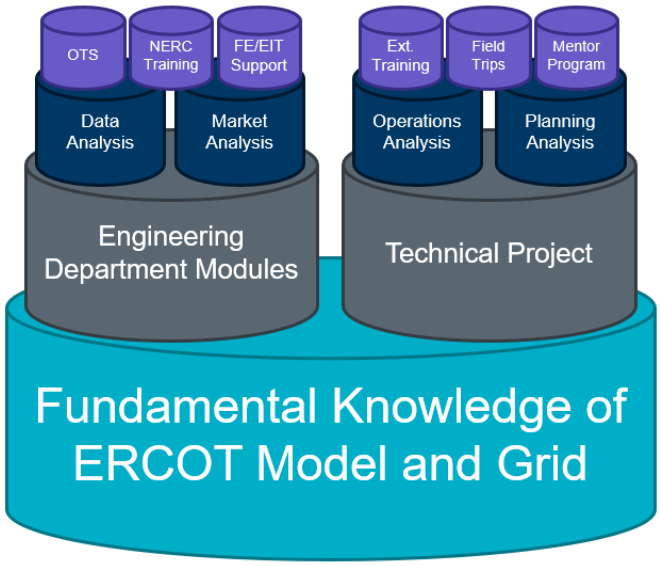
Program Structure:

Below is the typical breakdown for the type of work an EDP will be involved in based on the categories described in Part B.



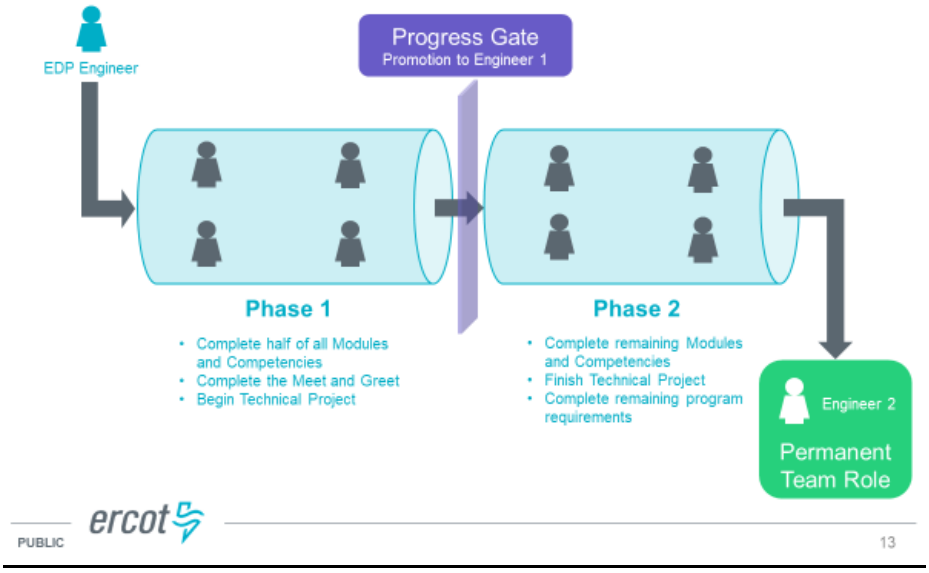
Fundamentals Knowledge for Engineers:

The below image shows EDP's expectations for work and training to help develop graduating EDPs as they are placed into their engineering department.



Program Progression:

This below image describes at a high level the process EDPs are expected to follow as they transition through the program.



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $424,035.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

None.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Grid Coordination Support & Development**
Location/Division	Taylor / Grid Coordination
Contact Name	Bill Blevins
Number of FTEs as of FY 2020	29
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Grid Coordination Support and Development consists of three groups:

- Network Modeling;
- Grid Applications Support; and
- Grid Applications Development

Network Modeling: The Network Modeling group develops, refines, and implements tools and processes to produce an accurate model of the ERCOT electric grid that is used in planning and operating a reliable electric system and facilitating the market.

Grid Applications Support (GAS): This group is responsible for the maintenance, reliability, accuracy, and operational development of ERCOT's advanced network applications, including State Estimator, Real Time Contingency Analysis, Contingency Analysis, Real-Time and Study Mode Operations Power Flow, Voltage Stability Analysis, and Dynamic Stability Analysis.

Grid Applications Development (GAD): This group creates and maintains tools and displays for all departments within Grid Planning and Operations. GAD also investigates new third-party software and provides support for numerous grid projects.

Major Activities:

Network Modeling

At the core of the modeling effort is the Network Model Management System (NMMS). NMMS acts as a single point of entry for network, market, and data for both ERCOT and Market Participants. ERCOT Network Modeling manages access to this tool, validates data entered into the tool, and translates this information into models of the system that are used by Market Participants and ERCOT.

Using NMMS, ERCOT Network Modeling delivers models weekly for real-time use cases; monthly for future auctions and studies; and biannually for longer-term use cases. These models are used by both ERCOT and Market Participant-managed systems.

Network Modeling constantly works with ERCOT IT and the product vendor to modify NMMS to accommodate new types of grid equipment (e.g., batteries), facilitate the addition of protocol-driven functionality in downstream systems (e.g., Relay Loadability Ratings), and create frameworks to accommodate significant design changes such as Real-Time Co-Optimization. *See infra*, Passport Program.

Grid Applications Support

The Grid Applications Support (GAS) group coordinates and interfaces with other ERCOT teams in System Operations Support, Network Modeling, GMS Production Support, Market Operations Support and System Operations to develop procedures and maintenance guides that assure proper performance and quality solutions of ERCOT's advanced network applications.

GAS is also responsible for testing and validating model loads and creating documentation/manuals for the applications. GAS provides 24/7 support for the State Estimator (SE) and other network applications. GAS also provides operator training to review existing functionality or discuss newly implemented features.

Grid Applications Development

Grid Applications Development works closely with groups in Grid Planning and Operations to assist in the development, maintenance, and management of user-developed tools. These applications often fulfill typical day-to-day needs of the user and serve to make the user more efficient. In working with these users, Grid Applications Development ensures that the tools remain available and maintained even after the initial requestor may have moved on to a new role.

Members of Grid Applications Development also serve as subject matter experts for larger projects, gathering requirements from the end-user and distilling the requests into actionable development items.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Network Modeling

The NMMS model contains approximately 5.1 million data instances, 11 million data associations, and 36 million data attributes. Updates and maintenance of these data instances, associations, and attributes account for more than 100,000 changes each year to the ERCOT Network Model. Each of these changes must go through a five-step validation process before ultimately being incorporated in time-dependent models that are used to control and monitor the ERCOT system. Inaccurate validation of modeling data can result in problems that prevent the timely loading of the most recent information into the system. No database loads have been delayed due to such inaccuracies or errors.

Grid Applications Support

Grid Applications Support personnel are on call 24 hours a day, seven days a week to address real-time issues with network applications used by ERCOT System Operators in the Control Center. For the ERCOT State Estimator—the backbone of all other network applications used in real-time operation of the ERCOT System—reports are generated monthly to maintain evidence of performance. The State Estimator has maintained a greater than 92% convergence rate as required by the Protocols. This convergence is required during normal and emergency operations.

Grid Applications Development

Most Grid Applications Development tools and displays leverage the ERCOT Network Model. In doing so, these displays remain up-to-date and do not require consistent maintenance, allowing the GAD team to create a large array of accurate and high-quality deliverables. Additionally, GAD can quickly create proof-of-concepts tools, which, for other applications, would take many months.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

Network Modeling

Modeling demands have increased in the last 15 years as the transition to a single-sourced model, accommodated by NMMS, has taken shape. This change was driven by the Nodal Market redesign efforts, which created protocols requiring consistent modeling across numerous use cases. As was intended during this market change, the Modeling group immediately gained downstream consumers. Additionally, due to the benefits of central repository of modeling data, many more processes and systems have since become consumers of NMMS data. Recent examples of these systems include ERCOT's new visualization tool GridGeo, Operator dashboards, and post-event reporting. Using the same source for model data allows the separate systems to communicate effectively.

As the ERCOT system grows, the Modeling work needed to manage and include those changes in the model also increases. Each change is reviewed to ensure quality issues do not arise. One factor driving this growth are upgrades to the transmission system due to population growth and economic drivers. Another factor is the increase in smaller inverter-based generation within the ERCOT footprint. The gains in ERCOT generation capacity are now made by many small generators rather than, as has historically been the case, frequent but larger generation construction.

Grid Applications Support

An accurate and well-maintained State Estimator is the key to real-time activities within ERCOT. As such, the Grid Applications Support team's role has always been needed and has not changed.

Grid Applications Development

In 2014, Grid Applications Development was created with a single member to support a protocol rule requiring ERCOT to "grade" Resource performance during frequency events. This required interfacing with the OSIsoft framework for which GAD eventually became the development owners. The GAD team grew to support the expanding number of user-created tools. GAD also transitioned the ownership and maintenance of the Control Center wallboard displays from a single SME to multiple members.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Network Modeling

NMMS, the Network Modeling application, has ties to ten major applications used in controlling and planning the ERCOT grid, as well as facilitating the ERCOT market. In addition, temporal models and model updates are used by ERCOT and numerous Market Participants for making both reliability and market decisions. The Modeling group also interfaces with the people responsible for submitting changes to the NMMS data. There are over 350 external users and 130 internal users who can submit modeling updates for ERCOT review.

Grid Applications Support

Grid Applications Support affects the real-time readiness of all advanced network applications in use in the ERCOT Energy Management System (EMS). Primary users are the ERCOT Operators who rely on the EMS advanced network applications to maintain situational awareness and reliability of the ERCOT System. ERCOT Market Participants also depend on the effectiveness of the advanced network applications to prevent damage to their equipment and ensure the ERCOT System remains a reliable source of power to serve their needs.

Grid Applications Support additionally provides support for Control Center staff during database loads. During this time, when new models are loaded into the production Market Management System (MMS) and EMS, issues may arise in the network applications solutions. GAS engineers work with the EMS applications and directly with Control Center staff to resolve these issues. Additionally, Grid Applications Support ensures that previously set operational parameters have not incorrectly changed during the loading process.

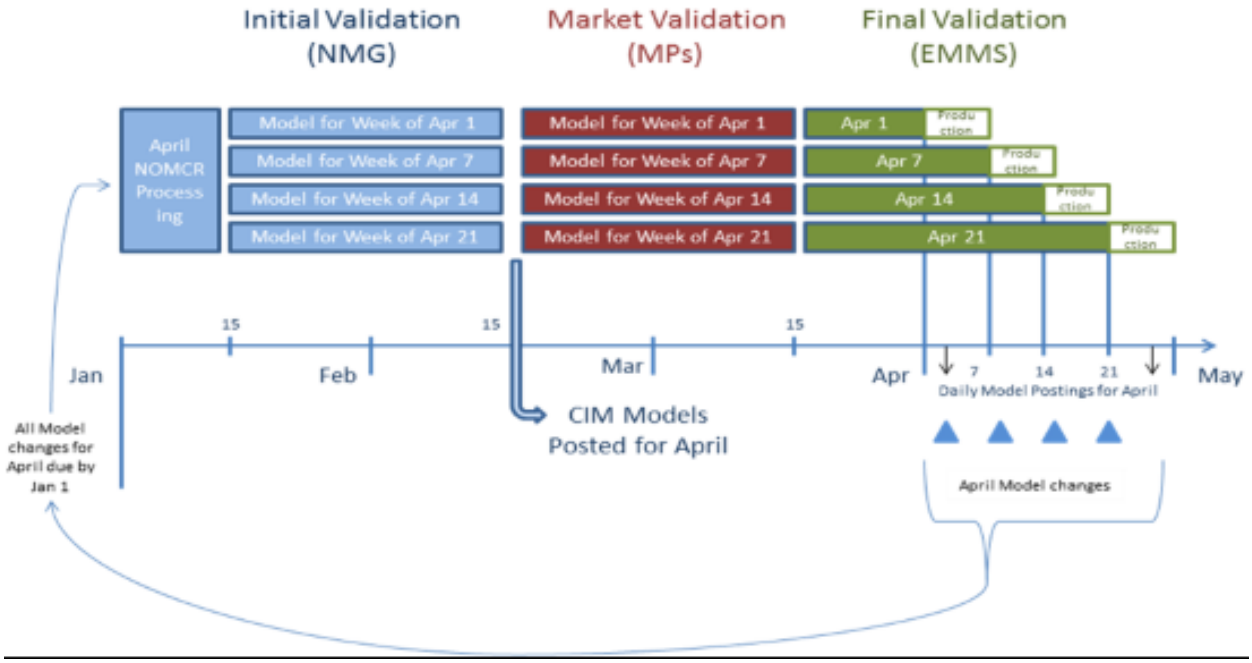
Grid Applications Development

Grid Applications Development interfaces with most, if not all, groups in Grid Operations and Planning. In addition to managing user-developed tools, GAD also sought out and introduced third-party software utilized by planning and operations staff. The GAD team are also initial testers for IT-driven software changes (e.g., OS updates) and serve as support when these changes are implemented.

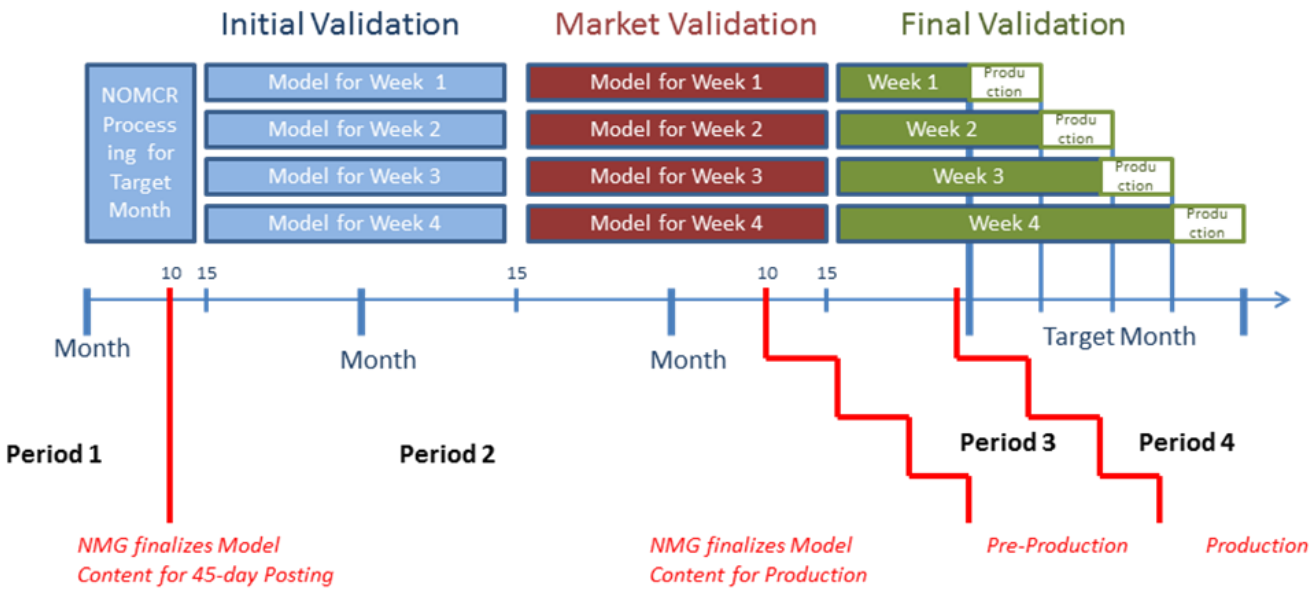
F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Network Modeling

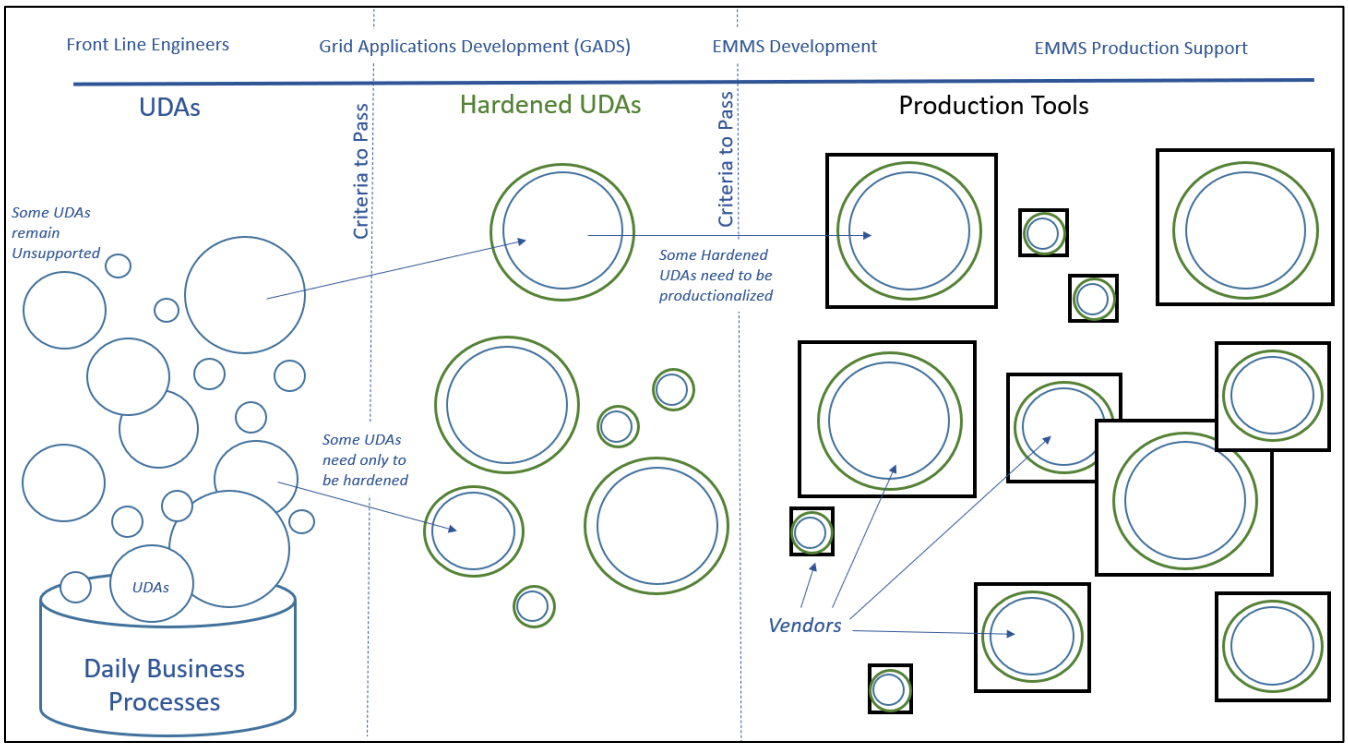
Below is a diagram from ERCOT's Modeling Expectation document, which depicts the protocol-driven submission timelines of equipment modeling. These rules provide sufficient time for ERCOT staff to review submissions.



Using the same diagram, key dates are highlighted when models are finalized for downstream use cases.



The diagram below illustrates the process by which the Grid Applications Development team maintains and hardens existing tools and, if necessary, works to transition these tools to IT-managed Production applications.



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $3,855,511.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Grid Coordination Support & Development outside service costs are attributable to contract engineering staff. These expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to provide additional temporary contract engineering staff.

Procurement/Accountability: ERCOT's procurement and human resources departments coordinate these services and ensure accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Renewable Energy Credit (REC) Program Administration**
Location/Division	Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	1
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

This program helps the State meet its renewable energy goals by acting as the program administrator for the Renewable Energy Credit (REC) trading program (*see* PUCT Substantive Rule 25.173). The REC program provides incentives to generating companies that locate in Texas and build renewable resource generation facilities. When these facilities generate one MWh of renewable energy, they earn one Renewable Energy Credit. That credit is tradable on the open market and is also used by retail entities to fulfill their renewable portfolio standard (RPS) mandates.

Major Activities:

Pursuant to PUCT Substantive Rule § 25.173, the Renewable Energy Credit (REC) Program Administration program must:

- create accounts that track RECs or compliance premiums for each participant in the trading program;
- award RECs or compliance premiums to registered renewable energy facilities on a quarterly basis based on verified meter reads;
- award offsets to retail entities on an annual basis;
- annually record the retirement of RECs or compliance premiums that each retail entity submits;
- retire each RECs at the end of the REC's compliance life;
- maintain public information on its website that provides trading program information to interested buyers and sellers of RECs;

- create an exchange procedure where persons may purchase and sell RECs or compliance premiums;

- make public each month the total energy sales of Texas retail entities for the previous month;

- perform audits of generators participating in the trading program to verify accuracy of metered production data;

- allocate the RPS requirement to each retail entity in accordance with the methodology set forth in PUCT Substantive Rule § 25.173; and

- submit an annual report to the PUCT discussing the amount of existing and new renewable energy capacity installed in the state; the owner and operator of each facility; the date each facility began to produce energy; the amount of energy generated in MWh each quarter for all capacity participating in the trading program or that was retired from service; and information concerning retail entities participating in the REC program and their RPS requirements.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

The primary purpose of the REC Program is to incentivize new renewable energy generation to move to Texas and generate electricity. As shown below, growth in renewable capacity in Texas has greatly outpaced the State's renewable energy goals.

In 2020, there were 307 REC generation accounts, with a total registered capacity of 41,120 MW. This renewable generation capacity far exceeds the 2025 target of 10,000 MW of installed renewable generation capacity (*see* PURA § 39.904). In addition, 6,437 MW of this total registered capacity was derived from non-wind renewable energy technologies installed after September 1, 2005, also far exceeding the 500 MW target for non-wind renewable generation capacity (*see* PURA § 39.904).

Technology Type	REC Gen Accts	Offset Gen Accts	New MW Capacity	Offset MW Capacity	Total Current MW Capacity
Biomass	8	0	285.8	0	285.8
Hydro	3	1	34.4	97.5	131.9
Landfill Gas	9	0	81.1	0	81.1
Solar	94	0	6189.1	0	6,189.1
Wind	193	2	34,529.8	109.2	34,639.0
Total	**307**	**3**	**41,120.2**	**206.7**	**41,326.9**

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The focus of the REC program has remained largely the same, although the State's renewable energy targets have changed since the program was first implemented. After successfully reaching the initial target of 2,000 MW of renewable generation capacity by 2009, the Legislature amended the target capacity to 5,000 by 2015 and 10,000 by 2025. These targets having now been met, the Legislature may choose to change the targets again in the future.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

All entities participating in the Texas REC program must sign an ERCOT participation agreement. They must also be registered with the Texas Secretary of State as a legal entity doing business in Texas. Consistent with PUCT Substantive Rule 25.173, renewable generators must participate in the program to receive REC awards, and retail entities must participate to fulfill their RPS mandate requirements. Other entities that wish to partake in the trading and retirement of Texas RECs must also participate in the program.

Specific information on these entities is available in ERCOT'S 2020 Annual Report on the Texas Renewable Energy Credit Trading Program to the PUCT, which may be found here: https://sa.ercot.com/rec/public-reports.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by one full-time employee overseen by the Settlement Metering manager.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Expenditures for this program are included with the Settlements Metering program.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information concerning the Renewable Energy Credit Program may be found at: http://www.ercot.com/services/programs/rec.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Market Rules & Stakeholder Support**
Location/Division	Austin, Taylor / Market Operations
Contact Name	Ann Boren
Number of FTEs as of FY 2020	6
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The objective of the Market Rules and Stakeholder Support program is to provide coordination for and transparency into the ERCOT governance process.

Major Activities:

The Market Rules and Stakeholder Support program facilitates stakeholder meetings, ensuring that all matters proceed through the stakeholder governance process in accordance with the governing document (primarily, the Protocols and Market Guides).

Specifically, Market Rules and Stakeholder Support:

- Facilitates the ERCOT Protocol and Market Guide revision processes, outlined here;
- Supports Protocol and Market Guide Revision Request development and changes (initial submissions, comments);
- Facilitates activities of the Technical Advisory Committee (TAC) and its subcommittees, which include the following:
  - Protocol Revision Subcommittee;
  - Reliability and Operations Subcommittee;
  - Retail Market Subcommittee; and
  - Wholesale Market Subcommittee.

(collectively, the "Subcommittees"). Committee activities facilitated by Market Rules and Stakeholder Support include agenda development; communication of issues with the subcommittee/TAC leadership; coordination and development of necessary meeting materials; coordination of ERCOT positions on Revision Requests being discussed; facilitation

of meetings (including developing meeting minutes for voting bodies); and capturing of Subcommittee and TAC actions and action items;

• Incorporates approved Revision Requests into the ERCOT Protocols and Guides, including preparation of documents for filing with the PUCT and posting of final documents to the ERCOT website;

• Develops and compiles TAC materials for the ERCOT Board meetings;

• Supports meeting scheduling for the Board, TAC, Subcommittees, working groups, task forces and necessary workshops;

• Facilitates the annual election of ERCOT membership to seat TAC and Subcommittee members.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

In 2020, Market Rules and Stakeholder Support:

• Managed all activities for 127 new Protocol and Market Guide Revision Requests, and completed 541 reports to document Board, TAC, and Subcommittee votes, recommended language and discussions related to the Revision Requests. These reports provide a procedural history and document decisions made in order to maintain transparency for all interested parties.

• Revised the source Protocol and Market Guide documents to reflect the new rules of the market as the Revision Requests completed the rule change process.

• Prepared 20 Protocol PUCT filings and website postings, and 24 Market Guide postings, all of which were posted within the required timelines.

• Supported 55 TAC and Subcommittee meetings and approximately 160 working group, task force and workshop meetings.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

Market Rules and Stakeholder Support has continually taken on increasing responsibility since its creation. Of note, the number of Protocols and Market Guides the program manages has increased over time to centralize the change control process for ERCOT and the market. At inception, the program managed only the Zonal Protocols and the Operating Guides. Today, the program manages the following documents:

• Nodal Protocols

• Settlement Metering Operating Guide

• Load Profiling Guide

• Retail Market Guide

- Commercial Operations Market Guide
- Nodal Operating Guide
- Planning Guide
- Resource Registration Glossary
- Verifiable Cost Manual
- Other Binding Documents (32)

The department has also taken on the meeting management responsibilities for TAC and its Subcommittees. Those responsibilities include: agenda development/management, coordination of ERCOT resources for meetings to ensure they are utilized effectively, and reporting TAC and Subcommittee decisions and action items back to ERCOT to limit the resources participating in the meeting.

Additionally, Market Rules and Stakeholder Support has increased the level of services it provides to the TAC and its Subcommittees for centralized coordination of meeting materials and consistent meeting discussion and voting documentation. The program also now has the added responsibility of facilitating the annual and replacement segment representative seating for the ERCOT Board, TAC and Subcommittees.

In 2020, due to effects of the pandemic, Market Rules and Stakeholder Support developed new processes and procedures to administer stakeholder meetings remotely while maintaining transparency into the stakeholder process.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Market Rules and Stakeholder Support provides coordination for, and transparency into, the ERCOT governance process for anyone interested in the rules or proceedings of the ERCOT market, including the following:

- All Market Participants;
- Any ERCOT Member;
- PUCT staff;
- The Reliability Monitor;
- The Independent Market Monitor (Potomac Economics);
- The NERC Regional Entity (the Texas Reliability Entity);
- ERCOT staff;
- Any entity that resides (or represents residents) in Texas or operates in the Texas electricity market; and

• Any entity that can demonstrate that the entity (or those it represents) is affected by the Customer Registration or Renewable Energy Credit Program Sections of the Protocols.

Market Rules and Stakeholder Support helps each of the above parties with their understanding of and participation in the revision process. The program also documents each step of the Revision Request process to provide transparency for all interested parties.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and five full-time employees.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $795,107.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Revision Requests that are approved through the stakeholder process facilitated by this program are incorporated into the Protocols and filed with the PUCT.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

In part, Market Rules and Stakeholder Support is responsible for coordinating the activities of the TAC, its Subcommittees, Subcommittee supports groups, including various working groups and task forces. An illustration of those groups supported by this program is provided below, together with links to additional information on each:

Technical Advisory Committee	
Protocol Revision Subcommittee	No support groups
Retail Market Subcommittee	Profiling Work Group
	Retail Emergency Conditions Task Force
	Retail Market Training Task Force
	Texas Data Transport and MarkeTrak Systems Working Group
	Texas Standard Electronic Transaction Working Group
Reliability and Operations Subcommittee	Black Start Working Group
	Dynamics Working Group
	Network Data Support Working Group
	Operations Training Working Group
	Operations Working Group
	Performance, Disturbance, Compliance Working Group
	Planning Geomagnetic Disturbance Task Force
	Planning Working Group
	System Protection Working Group
	Steady State Working Group
	Voltage Profile Working Group
Wholesale Market Subcommittee	Congestion Management Working Group
	Demand Side Working Group
	Market Credit Working Group
	Market Settlements Working Group
	Metering Working Group
	Resource Cost Working Group
	Supply Analysis Working Group
	Wholesale Market Working Group

Further, the processes for Protocol and Market Guide revisions, which this program oversees, may be found at the links below:

- Protocol Section 21
- Commercial Operations Market Guide Section 4
- Load Profiling Guide Section 2
- Nodal Operating Guide Section 1
- Planning Guide Section 1
- Resource Registration Glossary Section 1
- Retail Market Guide Section 3
- Settlement Metering Operating Guide Section 10
- Verifiable Cost Manual Section 13

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Settlement Metering**
Location/Division	Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	11
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Settlement Metering program supports the Texas wholesale electric market by ensuring the accuracy and timeliness of ERCOT Polled Settlement (EPS) meter usage data and the implementation of distribution loss factor methodologies. This program also provides EPS meter point modeling and mapping in the ERCOT Network Model. An EPS meter is any meter polled directly by ERCOT for use in the settlement of the markets.

Major Activities:

The Settlement Metering program is responsible for:

- **EPS Metering Design Proposal:** Reviewing and approving generation metering design and installation information to ensure the accuracy of the metering installation and corresponding energy measurements;

- **EPS Metering Site Certification**: Reviewing Transmission and/or Distribution Service Provider (TDSPs) site-specific documents for each EPS metering point and approving for compliance with ERCOT Protocol and Market Guide requirements;

- **Annual Meter Test Reports:** Reviewing Annual Meter Testing submitted by TDSPs;

- **Temporary Exemption Applications:** Reviewing and approving TDSP site-specific documents identifying issues with an EPS metering point;

- **Audits:** Performing on-site audits of EPS metering facilities to verify compliance with ERCOT Protocols.

- **Distribution Loss Factors:** Reviews and approves annual distribution loss factors submitted by distribution service providers. These factors are used to adjust meter data during the data aggregation process;

- **Data Processing:** Collects, validate, estimates, edits and processes EPS meter data daily;

- **Monitor Site Access:** Monitors TDSP access to EPS metering points; and

- **Issue Resolution**: Notifies TDSPs of issues with EPS meter communications and EPS meter data issues, and work with TDSPs to resolve these issues.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

In 2020, the Settlement Metering program:

- resolved 2,467 EPS Meter communication/data notification issues;

- processed approximately 1,500 manual data files to facilitate loading of EPS meter data for settlements;

- processed compliance information and interval data for over 880 EPS metering points;

- reviewed and approved 77 metering designs;

- reviewed and approved 993 site certification submissions;

- reviewed and approved 96 new temporary exemptions and closed 89 temporary exemptions;

- reviewed over 1,500 Annual Meter Test Reports for Protocol compliance;

- monitored EPS metering facilities site access for 2,034 TDSP field work activities;

- created 60 Network Operational Model Change Requests;

- worked with TDSPs in support of new protocol requirements for conversion to IP communications; and

- implemented new telemetry tool to assist in data estimations when EPS meter data is unavailable for settlements.

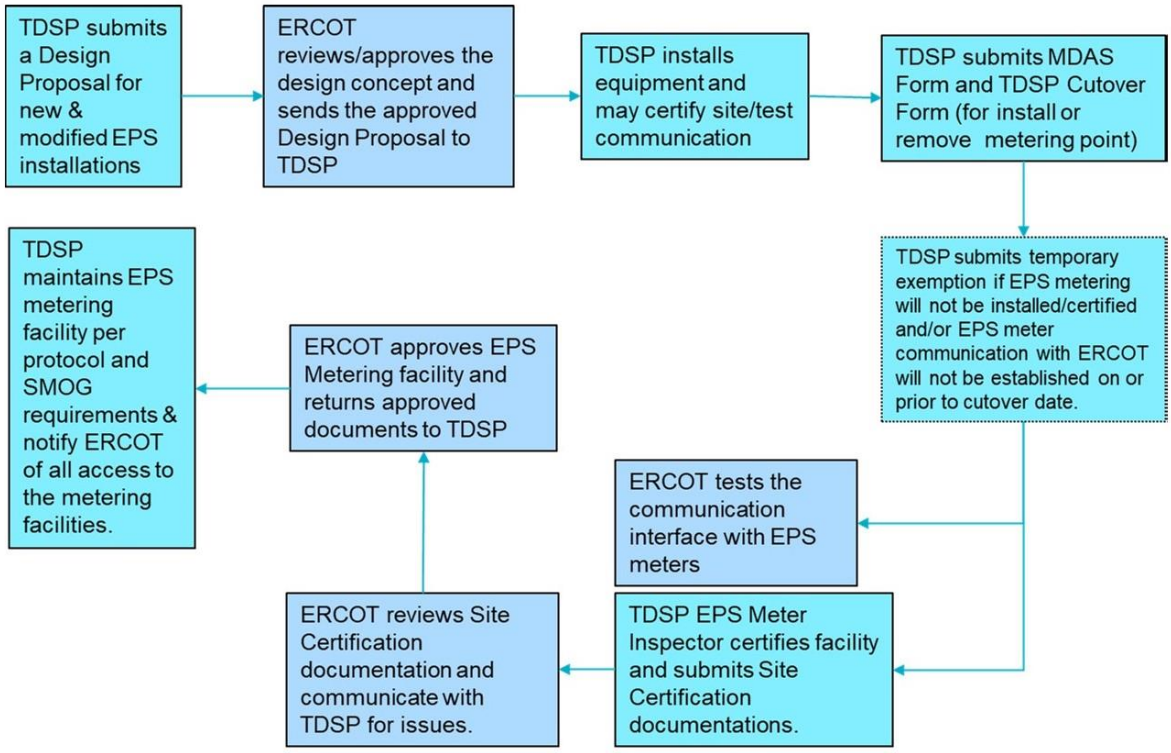
D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

While Settlement Metering has continually evolved its processes and procedures to support the implementation of market rule changes, the focus of this program has largely remained the same. The most notable change occurred in 2010 as part of the Nodal market implementation, when the program added operational processes for the placement of EPS Metering Points into the Network Model in support of Generation Resource real-time energy price calculations.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

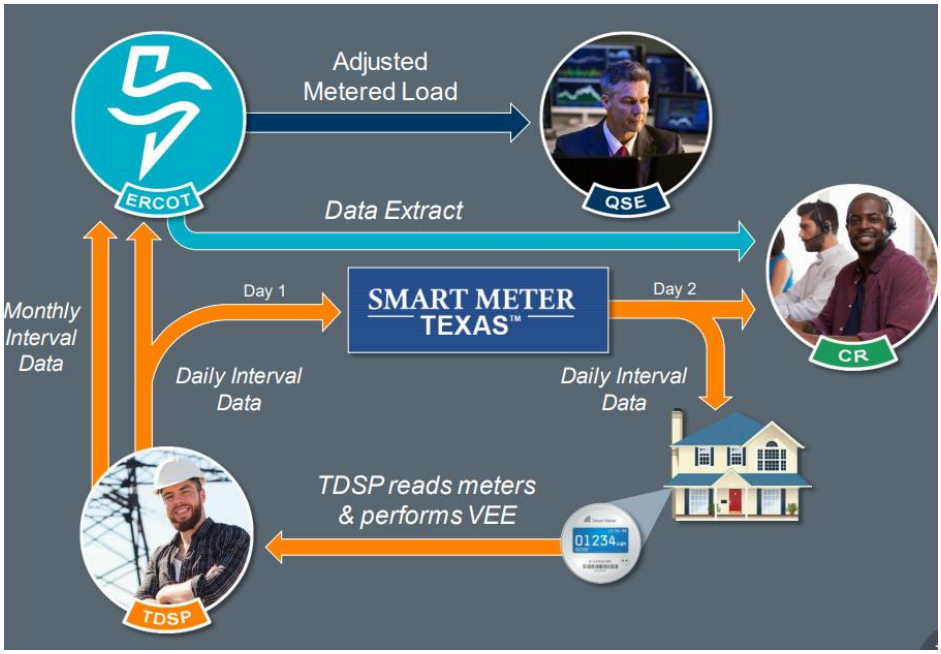
The EPS Metering Facilities measure the energy flows for all transmission-connected generation in the ERCOT market. These energy flows are used as the basis for wholesale

settlements in the ERCOT market, which impact all Market Participants. This program has significant interaction with Transmission and/or Distribution Service Providers (TDSPs) and some limited interaction with Resource Entities. The flowchart below shows the process for establishing an EPS Metering Facility.

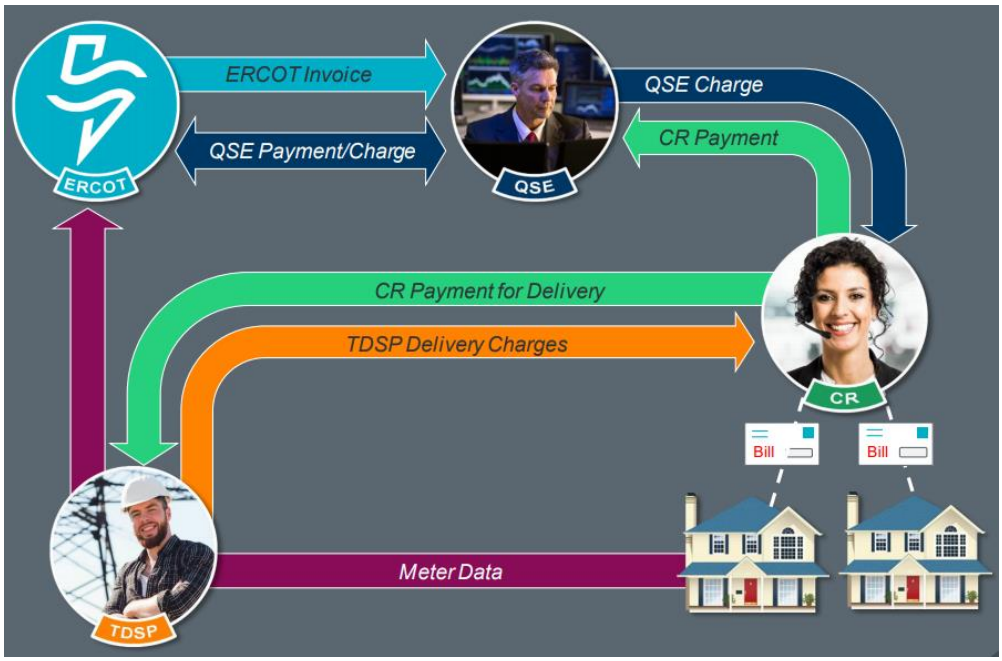


F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Settlement Metering is administered by a manager and ten full-time employees. The following diagram illustrates the flow of data from Advanced Metering Systems that is processed daily by ERCOT. *See also*, Data Loading & Aggregation Program, *infra*.



The diagram below illustrates how meter data is incorporated into the settlement process:



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 for this program and the REC program administration program total $2,028,585.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information concerning ERCOT Polled-Settlement Metering may be found at: http://www.ercot.com/mktinfo/metering/eps.

The ERCOT Settlement Metering Operating Guide may be found at: http://www.ercot.com/mktrules/guides/settlement/library.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Data Loading and Aggregation**
Location/Division	Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	5
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Data Loading and Aggregation program is responsible for ensuring the accuracy and timeliness of bill determinants used in settlements.

Major Activities:

This program's major activities include:

- Management of meter data loading processes for load and generation;
- Application of usage profiles for missing data;
- Management of load and generation data aggregation processes in support of settlements; and
- Calculation of transmission and distribution losses and Unaccounted-For-Energy (UFE).

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

The percent of Advanced Meter System Interval data captured at the time of final settlement has achieved a 99% goal. Similarly, the percent of Interval Data Recorder Meter Interval data captured at the time of true-up settlement has achieved a 99% goal.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The core services provided by the Data Loading and Aggregation program have been extended to include support for the ERCOT Nodal market, implemented in 2010.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

ERCOT's settlement system supports all Qualified Scheduling Entities (QSEs). Data Loading and Aggregation creates the billing determinants that are used in the settlement process to create invoices for these QSEs.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and four full-time employees.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $957,755.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

The program works directly with the PUCT on occasion, typically with respect to issues concerning meter data provided to ERCOT.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Settlement Operations**
Location/Division	Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	6
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Settlement Operations ensures that electricity production and delivery are accurately accounted for among generators and wholesale buyers and sellers in the ERCOT region.

Major Activities:

Settlement Operations processes and manages the wholesale financial settlements and billing that underpin the ERCOT market. Processes executed by this program include: batch scheduling, batch support, network model setup for settlements, validations of data received, data corrections, shadow settlement validations, and approvals of all settlement statements, invoices, and financial transfers. The program also supports dispute resolutions with the Client Services program and supports the annual SOC1 Audit.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

In 2020, Settlement Operations processed more than 632,557 Settlement Statements and 239,506 Settlement Invoices, all on time and with over 99.9% accuracy. The 2020 invoices account for annual billings of approximately $12 billion.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The functions of this program existed at ERCOT before the Nodal Implementation in 2010. Until 2015, however, the various ERCOT settlement tasks were combined under a single manager. In 2015, these tasks were split into the Settlement Operations and Settlement Services.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Settlement Operations provides services to all Qualified Scheduling Entities (QSEs) and CRR Account Holders (CRRAHs) participating in the ERCOT market.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and 5 full-time employees.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $777,161.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information concerning the ERCOT settlements process may be found at: http://www.ercot.com/mktinfo/settlements.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Settlement Services**
Location/Division	Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	9
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Settlement Services program's objectives are to:

- Ensure settlement systems and calculations are compliant with ERCOT Protocols and PUCT Rules;
- Ensure settlement systems and calculations are built to specifications and perform accurate settlements;
- Review and validate Generation Resource cost and operational parameters used in price formation and settlements;
- Aid in the development of policy and decision-making by writing protocols and performing ad hoc analysis; and
- Support stakeholders' situational awareness of settlement trends by creating and providing reports.

Major Activities:

Settlement Services' major activities include the following:

- **Verifiable Costs:** Settlement Services works directly with Resource Entities in auditing information for the ERCOT verifiable cost process; namely, by reviewing accounting information, contracts, Resource parameters and operational statistics. Once this audit is complete, these parameters are loaded into ERCOT systems and are used for Energy Offer Curve mitigation and for Make-Whole Payments. More information about Verifiable Costs may be found here.
- **Settlement Policy**: Settlement Services writes and reviews ERCOT Protocols concerning ERCOT settlements. These changes are based on ERCOT stakeholder driven changes, PUCT rule changes, legislative directives and internally identified issues and enhancements.

- **Project Work**: Settlement Services uses cases, test cases, and test data for settlement system changes. The program then tests changes to the settlement system and validates that changes are ready for a production environment.

- **Settlement Tools**: Settlement Services develops settlement tools that are used: by the Settlement Operations team for daily validation of settlements; for the unique settlement calculations that are not part of the settlement system; and in research for the "what if'" and sensitivity analysis of settlements.

- **Dispute Processing**: Settlement Services researches and prepares data corrections for complex disputes that are escalated from Client Services and Settlement Operations.

- **Reporting**: Settlement Services prepares regular and ad hoc reports for the ERCOT Board and for various internal and external stakeholders.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

- **Settlement Tools:** The validation tools created by Settlement Services were used to validate 632,557 Settlement Statements for approximately $12 billion dollars in 2020. Every calculation for every 15-minute settlement interval is validated by these tools.

- **Settlement Policy:** The protocol development effort for Real-Time Co-Optimization and Battery Energy Storage task forces was a significant multi-year policy development process that took place over 2019 and 2020. *See infra*, Passport Program. Settlement Services was heavily involved in this process, working with stakeholders and drafting protocol language, and helped ensure it was completed on time. The subsequent requirement writing process for Real-Time Co-Optimization and Battery Energy Storage program was another involved process with tight timelines, which Settlement Services also helped complete on time.

- **Reporting:** Reports prepared by Settlement Services have been consistently published timely and without any reported defects.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The functions of this program existed at ERCOT before the Nodal Implementation in 2010. Until 2015, however, the various ERCOT settlement tasks were combined under a single manager. In 2015, these tasks were split into the Settlement Operations and Settlement Services.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Settlement Services certifies system changes and validation tools for a system that services all Qualified Scheduling Entities (QSEs) and CRR Account Holders (CRRAHs) actively participating in the ERCOT market.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and nine full-time employees.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,178,445.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Settlement Services works on a limited basis directly with the PUCT. The program provides information and participates in discussions as requested by the PUCT. The program also develops protocol language and subsequent system changes in response to substantive PUCT rule changes.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Settlement Services has one outside services contract, as described below:

	Description
Vendor 1	This contract is to obtain the Fuel Index Price, Fuel Oil Price and Coal Index Prices, as directed by the ERCOT Protocols and Verifiable Cost Manual.

The cost of this service is shared with the Market Operations department.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe; why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Retail Operations**
Location/Division	Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	8
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Retail Operations ensures that information pertaining to competitive switching is processed and conveyed timely and accurately. The Retail Operations team serves as the retail market experts for Market Participants and external stakeholders.

Major Activities:

The Retail Operations program:

- Identifies and resolves any discrepancies that arise regarding customer Switching (process by which a customer requests a change in their electric provider) and Move In/Move Out (customer requesting service at a new residence) activities;

- Oversees certification of systems and business process compliance for prospective Retail Market Participants, and for prescribed changes for existing Market Participants;

- Acts as the ERCOT owner and subject matter expert for the retail issue resolution tool (MarkeTrak) and the 'flight' certification application (FlighTrak);

- Supports a variety of Market-Participant data transmission activities that utilize the NAESB (North American Energy Standards Board) protocols for transport;

- Serves as the ERCOT owner of the Mass Transition process, which distributes customer ESI IDs associated with a defaulting electric service provider to large and/or last resort electric providers in a timely manner;

- Manages end-use customer communications in the event of a valid Switch request, or upon initiation of a Mass Transition due to a defaulting electric provider.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

- Retail Operations files and publishes a comprehensive, quarterly assessment of Retail Market transaction timeliness and compliance with ERCOT Protocols, in addition to tracking internal key performance indicators.

- Retail Operations processes and verifies over 2 million inbound retail transactions per month, equating to over 375,000 Retail Electric Provider/end-use customer relationship changes.

- In 2020, Retail Operations managed approximately 170,000 retail market issues filed via MarkeTrak, and received and processed 770,471 valid Switch requests.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

Retail Operations has existed in some form since the advent of the competitive electric market in Texas in the early 2000s. The program's core functions have remained the same since that time, but its scope has evolved as the market and technology have matured.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

This program affects the customer-facing side of the ERCOT market, which includes approximately 7.9 million active, competitive Electric Service Identifiers (i.e., points on the system where electricity flows to a customer).

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Retail Operations is administered by one supervisor and seven full-time employees. The program is divided into two teams: one that focuses on day-to-day activities, and one that focuses on project and testing functions.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,342,854.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Retail Operations occasionally interacts directly with the PUCT, typically with respect to mass transitions of customers from a defaulting Retail Electric Providers to Providers of Last Resort.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Retail Operations has one contract in place, as summarized below:

	Description
Vendor 1	This contract is to generate postcards for end-use customers upon receipt of a valid Retail Electric Provider Switch request.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information about the ERCOT Retail Market may be found at: http://www.ercot.com/mktinfo/retail.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why

the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Market Design**
Location/Division	Taylor / Commercial Operations
Contact Name	David Maggio
Number of FTEs as of FY 2020	7
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Market Design program's main objectives are to:

- Perform analysis of wholesale market outcomes and proposed market design changes;
- Support stakeholder discussions of proposed market design changes; and
- Develop rules and requirements necessary to implement market design changes in the software that runs the ERCOT market.

Major Activities:

Market Design is responsible for:

- Performing quantitative and qualitative analyses of wholesale market outcomes and market design changes;
- Supporting discussions of market design changes in the ERCOT stakeholder process;
- Developing and reviewing proposed changes to the ERCOT rules governing the wholesale electricity market;
- Working with vendors and internal project teams to support and test changes to ERCOT market software;
- Generating market-facing analysis reports for market stakeholder forums upon request; and
- Resolving questions from Market Participants and other stakeholders concerning the above.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Market Design Changes: The Market Design program has supported many market design changes, both major and minor. Some of the major changes include:

- The fundamental transition from the Zonal to the Nodal market;
- Design and implementation of the operating reserve demand curve for ERCOT's scarcity pricing mechanism;
- Design and implementation of the reliability deployment price adder process to mitigate the system-wide price impacts of reliability deployments on wholesale prices;
- Design of a real-time market to co-optimize both energy and ancillary services;
- Changes in rules and software system to integrate new technologies into the grid, such as renewable and energy storage resources; and
- Changes to the suite of ancillary services procured within the wholesale market in order to maintain reliability of the power grid.

Additionally, the Market Design program supported discussion of many more market design changes that were evaluated by stakeholders and either ultimately not approved, or that are still under discussion, including:

- A multi-interval real-time market;
- A reliability deployment price adder process to mitigate the localized price impacts of reliability deployments on wholesale prices; and
- The modeling of transmission limitations within the real-time market.

Market Support: The Market Design program's subject matter experts (SMEs) support and frequently present analysis at one stakeholder meeting per week. These SMEs also regularly answer market-related questions from Market Participants that are directed through ERCOT's Client Services representatives.

Software Changes: For each market software release – typically, six per year – the Market Design team helps write software requirements; works with project managers and developers; performs acceptance testing of the software changes; and monitors performance immediately following deployment.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The name of this program was recently changed from Market Analysis to Market Design. This name change came after the reorganization of the existing staff to reflect an increased focus on the quality of delivered software changes. Otherwise, the Market Design program has largely been in its current form since the implementation of the ERCOT Nodal market in 2010. Since that time, the primary objectives of the program have not significantly changed, although the specific day-to-day continues to evolve as driven by wholesale market design and policy discussions.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Market Design affects the following persons and entities:

- Wholesale Market Participants (primarily, Qualified Scheduling Entities);
- The Independent Market Monitor;
- ERCOT System Operations;
- ERCOT Settlement Operations;
- ERCOT Day-Ahead Market;
- ERCOT Client Services;
- ERCOT Compliance; and
- ERCOT Communications.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Market Design has one manager, one supervisor, and a total of nine other full-time employees. The program reports to the Director of Market Design and Analytics.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,610,181.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Market Design works directly with the PUCT on occasion, providing data and analysis related to the ERCOT wholesale market upon request.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Market Validation**
Location/Division	Taylor / Commercial Operations
Contact Name	David Maggio
Number of FTEs as of FY 2020	6
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Market Validation program's main objectives are to:

- Maintain and monitor the key applications in the ERCOT Market Management System (MMS);
- Validate the correctness of day-to-day market results; and
- Identify inconsistencies across the components of the wholesale electricity market in order to support ERCOT's overall goal of providing electric grid reliability and market efficiency.

Major Activities:

Market Validation is responsible for:

- Monitoring the overall performance of the software used to administer the wholesale electricity market within ERCOT;
- Validating the day-to-day results of the wholesale electricity market using software to review pricing outcomes;
- Working with vendors and internal IT teams to maintain and update ERCOT MMS applications;
- Generating and maintaining market reports per requests and protocols;
- Performing analysis for and otherwise supporting other ERCOT Commercial Operations programs to ensure consistency across the components of the wholesale electricity market; and
- Supporting ERCOT stakeholder meetings by providing subject matter expertise.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

One measure of the effectiveness and efficiency of this program is the performance of the ERCOT markets. Market results are posted on the ERCOT website and the market information system, which Market Participants can evaluate and raise concerns or questions through ERCOT's Client Service Representatives or at stakeholder meetings.

Another measure is the quality of ERCOT market results. ERCOT sets several key performance indicators to track the quality of the wholesale market results by calculating the percentage of erroneous prices leading to price correction. These key performance indicators are updated annually and reviewed quarterly. In addition, the processes of price validation and price correction for the wholesale electricity market are considered part of ERCOT's market settlement operations, and therefore subject to an annual system and control audit.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The Market Validation program was introduced during the implementation of the ERCOT Nodal market. After the Nodal market went live in 2010, the Market Validation program became a key component of ERCOT Commercial Operations. Although its objectives have not significantly changed, the program has continued to add new validation rules and processes as the rules and policies governing the ERCOT wholesale market have evolved; e.g., changes to the scarcity pricing mechanism and the introduction of the reliability deployment price adder process. Also, over the years, there have been some additions to the program's functions, such as such monitoring transmission congestion on the grid and its effects on market outcomes, and providing input and support for Congestion Revenue Rights auctions.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Market Validation operations affect the following persons and entities:

- Wholesale Market Participants (primarily Qualified Scheduling Entities);
- The Independent Market Monitor;
- ERCOT System Operations;
- ERCOT Settlement Operations;
- ERCOT Day-Ahead Market;
- ERCOT Congestion Revenue Rights; and

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Market Validation has one supervisor and five other full-time employees. The program reports to the Director of Market Design and Analytics.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $857,488.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Market Validation works directly with the PUCT on occasion, providing data and analysis related to the ERCOT wholesale market upon request.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Congestion Revenue Rights**
Location/Division	Taylor / Commercial Operations
Contact Name	Sandip Sharma
Number of FTEs as of FY 2020	7
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Congestion Revenue Rights program oversees and manages the Congestion Revenue Rights component of the ERCOT market. A Congestion Revenue Right (CRR) is a financial instrument that results in a charge or a payment to the CRR holder when the ERCOT transmission grid is congested in the Day-Ahead Market (DAM). CRRs may be used either as a financial hedge or as a financial investment. Used as a hedge, a CRR locks in the congestion price at the CRR's purchase price. As an investment, a CRR may be used to speculate whether the congestion rent will be greater than the purchase price.

The ERCOT CRR market serves to:

- Support a liquid energy market by providing tradable financial instruments for the hedging of transmission congestion charges;
- Allow Market Participants to eliminate or greatly reduce the cost uncertainties resulting from transmission congestion charges; and
- Encourage competitive energy trading where the costs of congestion might otherwise be an impediment.

Major Activities:

- **Create and post CRR Network Models**: The CRR program creates a CRR Network Model for the annual Pre-Assigned CRR (PCRR) allocation and for each auction. For each calendar year, 25 CRR Network Models are created (12 monthly auctions, 12 long-term auctions, and 1 annual PCRR allocation).
- **Annual and monthly PCRR allocations**: The CRR program facilitates the allocation of PCRRs to eligible municipals and co-operatives who chose not to opt in to retail competition when the Texas electric market was de-regulated (Non-Opt-In Entities, or NOIEs).

- **CRR auctions:**
    - Long-Term Auctions: The CRR program facilitates a series of six-month rolling auctions (*see below*) that gives CRR Account Holders the opportunity to obtain CRRs for up to three years into the future. CRRs effective for the auction months that were obtained in a previous auction, allocation, or bilateral trade can also be offered for sale in the auction.

    - Monthly Auctions: The CRR program also facilitates a monthly auction that gives CRR Account Holders the opportunity to obtain CRRs for the upcoming month.

- **Bilateral trades**: CRRs can be traded bilaterally to another qualified CRR Account Holder, pending an approval by the ERCOT Credit team. The CRR program monitors bilateral trades and helps ensure that they are completed successfully.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

There are numerous criteria by which the effectiveness and efficiency of the CRR market can be judged, but the ever-increasing participation of Market Participants is a key indicator that there is continued value in the CRR market. In the last five years, the number of qualified CRR Account Holders has grown from about 175 to about 325, and the number of qualified Counter-Parties has grown from about 100 to about 190. Submitted auction transactions (bids to buy and offers to sell), allocated auction credit, and auction revenues have also grown steadily. Payments to CRR owners have additionally increased, while the actual CRR payouts have remained very close to the expected payouts.

Another efficiency measure is the CRR program's consistent meeting of auction deadlines set forth under the ERCOT Protocols. Meeting deadlines for each auction task—e.g., posting the model, the credit adders report, the auction notice, and the auction results—engenders the CRR Account Holders' confidence in ERCOT's ability to keep up with the increasing participation in CRR auctions, and to provide a reliable and predictable level of service.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The ERCOT CRR market began with the Nodal market implementation in 2010. Previously, ERCOT facilitated a Transmission Congestion Rights (TCR) market, which did not have the same structure for auctions or allocations. The overall purpose and structure of the CRR market has remained the same since 2010 except for several minor adjustments, including:

- Auction transaction limits and protocol clarifications for PCRR eligibility;

- The original CRR market was an annual process to hold one-year auctions for the next two calendar years. In 2013, however, these annual auctions were broken into a series of four long-term auctions to cover the next two calendar years in six-month auction blocks;

- In 2018, a third year of long-term auctions was added, resulting in the current structure of the CRR team holding (1) a monthly auction; and (2) a rolling six-month, long-term auction during each calendar month.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

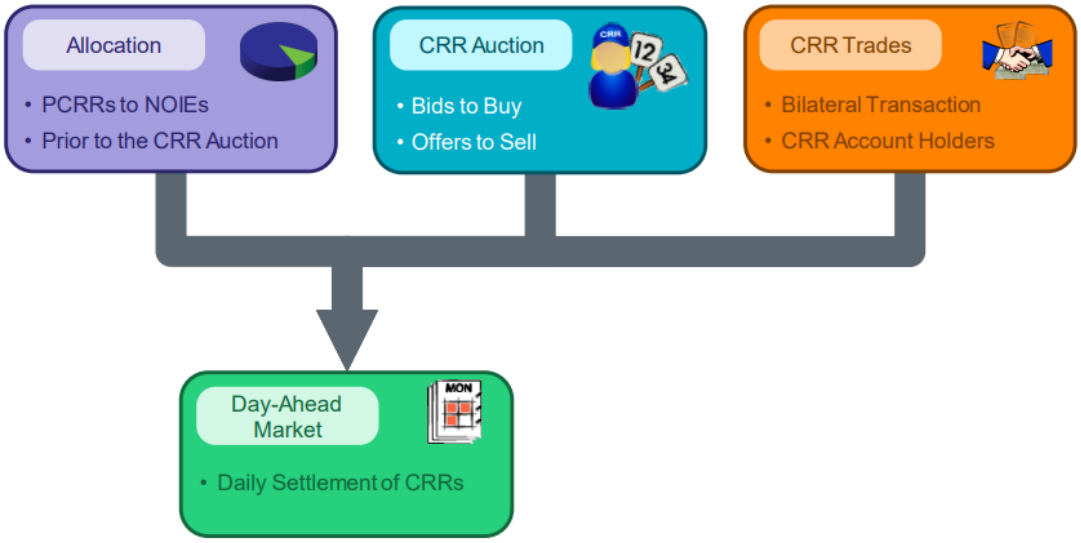
The functions of the CRR program primarily involve CRR Account Holders and Counter-Parties. As noted above, a CRR Account Holder is an entity that is qualified to become the owner of record of CRRs. A Counter-Party is the ERCOT credit entity; each CRR Account Holder must be associated with a qualified Counter-Party in order to participate in CRR auctions. Further, a CRR Account Holder cannot purchase CRRs unless their associated Counter-Party allocates credit to the auction. The Counter-Party's available credit is monitored by the ERCOT Credit team, and the CRR system prevents Counter-Parties from allocating more credit to an auction than is available under credit limit at the time the auction bid window closes.

The CRR market currently has 328 qualified CRR Account Holders associated with 194 qualified Counter-Parties.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and five full-time employees. Processes involved in this program are pictured at a high level below:

CRR LIFE CYCLE



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $921,360.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information about Congestion Revenue Rights may be found at: http://www.ercot.com/mktinfo/crr. Training materials describing this program's functions may be found here.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Day-Ahead Market**
Location/Division	Taylor / Commercial Operations
Contact Name	Sandip Sharma
Number of FTEs as of FY 2020	7
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Electricity markets administered by ERCOT between buyers and sellers include the Day-Ahead Market and the Real-Time Market.

- **Day-Ahead Market (DAM):** is a voluntary, financially binding daily market that occurs the day before the Operating Day for buyers and sellers to transact energy, Ancillary Services, and congestion.

- **Real-Time Market (RTM)**: is the daily energy market that occurs during the Operating Day.

The DAM is generally used by Qualified Service Entities (QSEs) to hedge energy and congestion costs against the risk of price volatility in real-time.

Major Activities:

The DAM program is responsible for all aspects of preparing, executing, and communicating the results of the DAM, including:

- **Preparing for the DAM**: DAM operators verify required postings on the Market Information System (MIS) for the next Operating Day and review external system data interfaces to ensure upstream source data has been transferred into the Market Management System (MMS).

- **Executing the DAM**: DAM Operators then confirm parameters and initiate the DAM application. During the DAM execution, the optimization engine will iterate through solutions, and DAM operators will monitor the validity of the iterative solutions while monitoring the workflow messages to determine if any errors have been flagged.

- **Verify the DAM:** Once the DAM has converged, it is analyzed using the Price Validation code. DAM operators will then verify the validity of the final solution and confirm it is ready for publishing.

- **Publish Results:** After DAM operators validate the results of the DAM, these results are communicated to Market Participants via the MIS and Market Manager. Lastly, the final DAM input/output data is transferred to the Settlements system for processing.

DAM operators and support engineers also manage DAM-related inquiries from Market Participants concerning modeling, submissions, awards, and potential downstream impacts.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Participation in the DAM has increased from 103 unique QSEs and sub-QSEs upon the Nodal go-live in December 2010, to as many as 330 unique QSEs and sub-QSEs in a single DAM Operating Day in March of 2021. By one measurement, the volume of DAM energy purchases was 64% of real-time load in 2020. This significantly increased level of DAM participation demonstrates the DAM's effectiveness in allowing Market Participants to manage exposure to real-time prices.

The DAM has also successfully procured the daily-required Ancillary Services to maintain grid reliability in real-time. Only in rare, emergency instances have there been shortages of Ancillary Services in the DAM.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The DAM began with the Nodal market implementation in December 2010. The original DAM concepts have not changed, but the DAM has been refined by the protocol changes since that time, including:

- NPRR322, Real-Time PTP Option Modeling, which changed Point-to-Point (PTP) Option modeling to PTP Obligation Bids with Links to an Option;

- NPRR515, Day-Ahead Market Self-Commitment of Generation Resources, which changed self-commitment from daily to hourly;

- NPRR775, Enhanced Implementation of Limits for Fast Responding Regulation Service, which introduced the Fast Responding Regulation Service;

- NPRR833, Modify PTP Obligation Bid Clearing Change, which changed the PTP logic to account for pick-up effect;

- NPRR1051, Removal of the Price Floor Applied to Day-Ahead Settlement Point Prices, which removed the administrative price floor from all Day-Ahead Settlement Point Prices; and

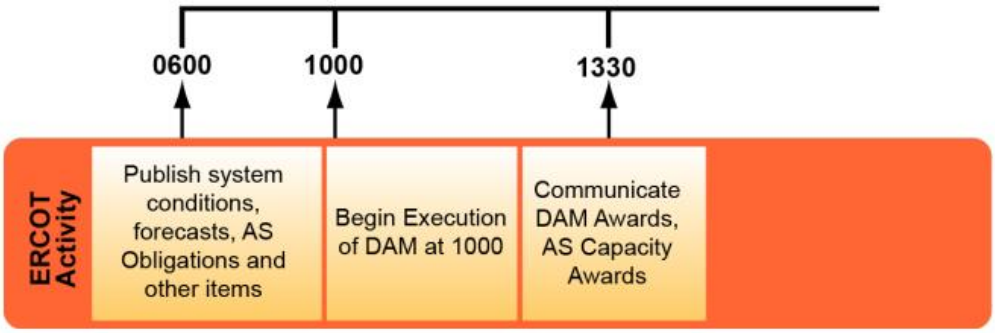
- NPRR1080, Limiting Ancillary Service Price to System-Wide Offer Cap, which modified the calculation of the Real-Time On-Line Reliability Deployment Price Adder.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The DAM market impacts QSEs that represent or are in partnership with Load Serving Entities (LSE), Resource Entities (RE), CRR Account Holders (CRRAH), or Counter Parties (CP).

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and seven full-time employees. DAM activities normally begin at 5:00 a.m. and are completed by 1:30 p.m. the day prior to the Operating Day. The DAM is executed daily, including weekends and ERCOT holidays.



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,149,248.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information concerning ERCOT's Day-Ahead Market and Real-Time Market may be found at: http://www.ercot.com/mktinfo/dam.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Demand Integration**
Location/Division	Taylor / Commercial Operations
Contact Name	Sandip Sharma
Number of FTEs as of FY 2020	5
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Demand Integration team administers the ERCOT Emergency Response Service (ERS) program and manages Load Resource participation into ERCOT market.

- **ERS:** PUCT Substantive Rule 25.507 requires that ERCOT administer ERS, a special emergency response service deployed in an Energy Emergency Alert (EEA) event to assist in preventing or reducing the impact of firm load shed.

- **Load Resource participation:** Load Resources are loads that register with ERCOT and meet the requirements to provide Ancillary Services or participate in ERCOTs energy market. They can participate as either Controllable or Non-Controllable Load Resources, with each having a different set of requirements.

Major Activities:

The ERS program:

- Supports Qualified Services Entities representing ERS Resources with processes to understand the demand response potential of their resources prior to making offers into the next ERS Standard Contract Term;

- Executes the procurement process for each ERS Standard Contract Term;

- Periodically tests and evaluates the performance of each ERS Resource and, if an ERS deployment event occurs, evaluates Resource performance for that event;

- Evaluates each ERS Resources' term availability at the end of each ERS Standard Contract Term;

- Combines test/event deployment performance and term availability to calculate payment information provided to ERCOT Settlement and Billing.

With respect to Load Resources, the Demand Integration team:

- Assists Resource Entities with the registration of new Load Resources;
- Performs tasks to add new Load Resources into the Network Model;
- Performs qualification tests and evaluation performances;
- Performs test deployments and performance evaluations for each qualified Load Resource as required to maintain qualification status; and
- Perform performances evaluation for each Load Resource following any deployment events.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

ERS: Demand Integration has been successful in qualifying, testing, procuring and deploying ERS during EEA events over the years, typically providing 800-1,000 MW of load relief when deployed.

Load Resources: Similarly, Demand Integration has been successful in qualifying, testing, procuring and deploying Load Resources. This includes both the manual deployments initiated by ERCOT operator instructions, as well as the automatic deployment through the under-frequency relay.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

ERS: The ERS program has gone through a number of changes since its inception in 2007. The program, initially named Emergency Interruptible Load Service (EILS), was originally designed as a load reduction program only with a 10-minute ramp requirement. Following the February 2011 winter event, the program was modified to allow dispatchable distributed generation to participate, and was then rebranded as the Emergency Response Service. About a year later, it against modified to include a 30-minute ramp product, which allowed many more sites with less sophisticated deployment technology to participate in the service. In 2014, a weather sensitive product type was added to both the 10 and 30-minutes ramp products that allowed commercial and residential loads driven by electric heating and cooling load to participate.

Load Resources: There have been relatively few changes to Load Resources that affected Load Resource administration since it began in 2002.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

This program supports services provided by Qualified Scheduling Entities.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and five full-time employees.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,010,024.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information concerning Load Resource participation in the ERCOT Market may be found at http://www.ercot.com/services/programs/load/laar/index.html.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Credit Risk Management**
Location/Division	Austin, Taylor / Commercial Operations
Contact Name	Mark Ruane
Number of FTEs as of FY 2020	5
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Credit Risk Management program manages and administers ERCOT Protocols concerning financial or credit requirements that apply to all Market Participants and exist to maintain the financial stability of the ERCOT market.

Major Activities:

Credit Risk Management performs those functions required under the Protocols, including:

- reviewing and approving credit applications for entities applying to become an ERCOT Counter-Party;
- obtaining and reviewing financial statements and establishing unsecured credit limits for Counter-Parties or their guarantors;
- determining credit limits for CRR Account Holders for CRR auctions;
- monitoring credit exposure and determining the amount of collateral needed from Counter-Parties on an ongoing basis;
- issuing collateral requests and managing collateral held for Counter-Parties; and
- taking enforcement actions for payment defaults and late payments.

In addition, Credit Risk Management provides information to and works with the PUCT, the ERCOT Board, the Technical Advisory Committee, and other stakeholders to address credit risk in the ERCOT market and to help maintain the long-term financial integrity of the market.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Credit Risk Management has successfully provided for the management and administration of ERCOT Protocols concerning financial and credit requirements. Through the selective extension of credit, and by maintaining adequate levels of collateral in the event of Market-Participant default, the program has been able to mitigate losses in the ERCOT market and maintain its financial integrity.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The functions described above have been in place since the ERCOT market opened in 2001. Beyond the day-to-day credit management processes, Credit Risk Management has continually played a key role in addressing credit risk when Market Participants default in the market, both when entities leave the market through a mass transition and when they restructure through the bankruptcy process.

In addition, Credit Risk Management continues to highlight credit risk factors and work with stakeholders to understand and manage credit risk in the market. Credit Risk Management will continue to play a key role as long as there are financial transactions in the ERCOT market.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Credit Risk Management directly impacts all Counter-Parties (the ERCOT credit entity). This program manages Counter-Parties upon their entry into the ERCOT markets and continually thereafter, so long as they continue to participate in the markets. ERCOT creditworthiness requirements for Counter-Parties are set forth in Section 16.11.1 of the Protocols.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Credit Risk Management is administered by a manager and four full-time employees. The program's functions are regularly reviewed by the Board, and currently include:

Action	Frequency
Review and approve Credit Application for entities applying to become an ERCOT Counter-Party	As applications are received
Obtain and review financial statements and establish unsecured credit limits for ERCOT Counter-Parties or their guarantors	Detailed reviews occur quarterly and monitoring occurs daily based on press releases and other information available in the market
Determine credit limits for CRR Account Holders for CRR auctions	Generally occurs daily
Monitor credit exposure and determine the amount of collateral needed from Counter-Parties on an ongoing basis	Monitoring for changes in activity occur daily with calculations done at least daily

Issue collateral requests and manage collateral held for Counter-Parties	Occurs as activity warrants
Take enforcement actions as provided in the Protocols for payment defaults and late payments	Occurs as needed
Reporting on market-wide credit risk	Occurs monthly as needed
Work with stakeholders (PUCT, BOD and market) on credit risk issues	Occurs as needed

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $938,048.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

Credit Risk Management has annual subscription expenditures summarized as follows:

Description	
Vendor 1	This contract is to provide additional temporary contract engineering staff.
Vendor 2	This contract is to provide ERCOT with commercial data, analytics, and financial insight about the market.
Vendor 3	This contract is to provide ERCOT with financial intelligence and analytical data to assist with credit reviews.

Vendor 4	This contract is to provide real-time data on the market, breaking news, in-depth research, and analytics that can be used when reviewing credit.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $244,637.

Procurement / Accountability: ERCOT's procurement and human resources departments coordinate these services and ensure accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

More information concerning ERCOT's credit functions may be found at http://www.ercot.com/services/rq/credit. Credit management training materials may be found here.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	Passport Program Implementation
Location/Division	Austin & Taylor / not applicable
Contact Name	Matt Mereness
Number of FTEs as of FY 2020	11*
Statutory Citation for Program	N/A

*"Full time equivalent" numbers are used, since very few employees worked full time on the program. In 2020, there were 75 staff charged at least part-time to the Passport Program.

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Passport Program, as initially designed, was composed of three efforts:

RTC Implementation: The original objective of the program was to begin implementation activities in support of Real-Time Co-Optimization (RTC). RTC is a market design change to expand the real-time market to include ancillary services with energy in the real-time market solution. ERCOT had deferred this functionality from the Nodal program scope in 2010 due to the added complexity for an already large and complex program. However, RTC continued to be discussed over time and, in 2018, two studies were published (by ERCOT and the Independent Market Monitor) outlining the reliability and economic benefits of implementing RTC. Accordingly, in 2019, the PUCT instructed ERCOT to proceed with implementing RTC.

EMS Upgrade: Parallel to the RTC implementation effort was the need for ERCOT to perform a technology upgrade of its Energy Management System (EMS). Both the RTC implementation and EMS upgrade efforts were expected to take 3-5 years.

ESRs, DGRs, ECRS: In implementing the above, the program would also consider the reliability needs of the emerging technologies of Energy Storage Resources (ESRs), Distribution Generation Resources (DGRs), and introduce a new 10-minute Ancillary Service defined as ERCOT Contingency Reserves Service (ECRS).

ERCOT made the strategic decision to run the RTC implementation and EMS upgrade efforts under a single program to coordinate their interdependent implementations, and to go-live together as a single solution. Passport became the name for the single collective program, which, in sum, had the objective to deliver RTC on the new EMS upgrade platform, with functionality to support ESR, DGR, and ECRS.

However, in 2021, the Passport RTC market design change was de-coupled from the EMS upgrade due to ERCOT staffing resource constraints and risks to the EMS upgrade. The EMS upgrade is still active and advancing forward as its own project, but the Passport market design scope has been placed on hold for at least one year as new delivery sequences are being evaluated.

Activities:

The Passport Program was responsible for strategically planning and executing the implementation of new protocols and software systems to accomplish the above objectives. The program was set to manage the master program schedule, ERCOT staffing efforts, vendor development and support, program risks and mitigation, and the budget to deliver the protocols and systems by July 2024.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function? In Exhibit 12, provide a list of statistics and performance measures that best convey the effectiveness and efficiency of this program or function. Also, please provide the calculation or methodology behind each statistic or performance measure.

Before its hiatus, the Passport Program was able to achieve on-time delivery for the following milestones:

- create a market-facing Real-Time Co-Optimization Task Force in April 2019 reporting to the TAC;
- establish an internal Charter and Executive Steering Committee in April 2019;
- complete the development of RTC Principles from April-December 2019;
- complete and publish initial Protocols and Impact Analyses for RTC, ESR, and DGR in March 2020;
- develop an initial integrated master schedule with market design and EMS upgrade in Q4 2020;
- charter and initiate key EMS, MMS, and S&B market design project efforts in Q4 2020;
- obtain Board approval of all required protocol changes in December 2020.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

More details about the history, scope, and development of the Passport Program may be found here (which contains all filings in PUCT Project 48540 concerning the "Review of Real-Time Co-Optimization in the ERCOT Market.")

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

When the new market design is successfully launched, it will have a significant impact on Qualified Scheduling Entities in the ERCOT wholesale market. This program does not affect Retail Entities or Congestion Revenue Rights Account Holders.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The Passport program was defined and administered using an internal Passport Program Charter, which defined its governance, roles, and responsibilities, and the scope for delivering the program across the different departments as follows:

Charter Purpose & Scope:

The Passport Team is composed of the ERCOT staff responsible for the development and delivery of the revision requests, the requirements, projects, and workplan necessary to implement high-priority projects to be implemented in conjunction with the EMS Release at ERCOT, including Real-Time Co-Optimization (RTC), Battery and Energy Storage (BES) and Distribution Generation Resources (DGR).

The leadership roles and organization charts will focus on the RTC, BES, and DGR efforts that will align with the EMS Project that is already in flight.

Leadership roles and responsibilities:

Executive Sponsors

The Executive Sponsors oversee and guide the activities of the RTC, BES, and DGR Teams. The Executive Sponsors are accountable and responsive to both the PUCT and ERCOT Board regarding the high-level strategy and risks in implementing these projects. The Executive Sponsors are ultimately accountable for implementing all aspects of the RTC, BES, and DGR program development and implementation as endorsed by the Passport Steering Committee.

Program Director

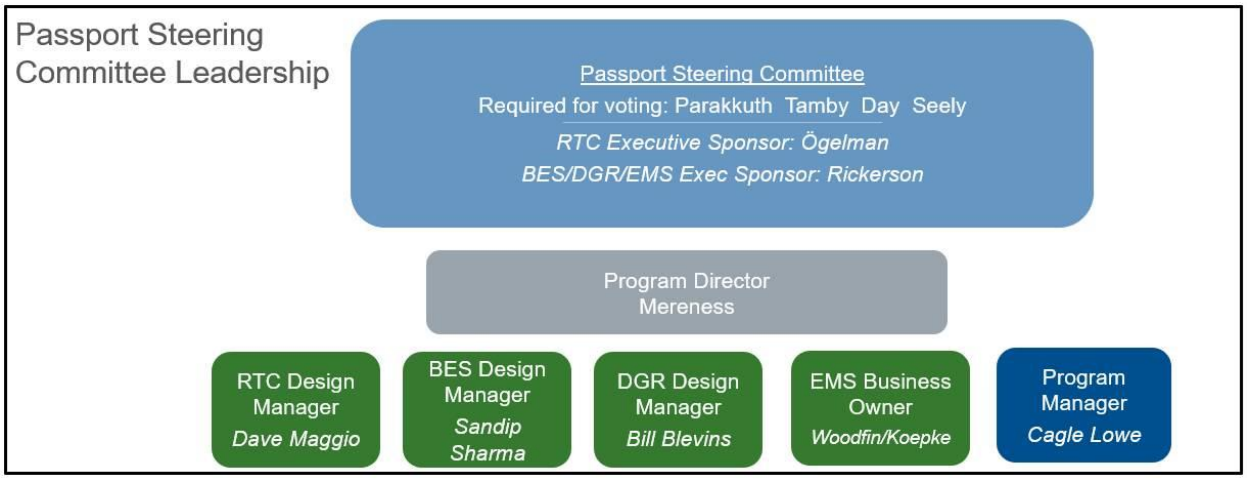
The Program Director leads the RTC, BES and DGR Teams and is responsible for the planning and execution of the overall project efforts. The Program Director works with the Executive Sponsors to establish the necessary deliverables in support of the programs, as well as provide effective communication, coordination, and prioritization of the efforts across the team and stakeholders.

Design Managers

The Design Managers lead the design efforts of the RTC, BES, and DGR programs. The Design Managers work externally with stakeholders and internally with other ERCOT business and technical leads to develop the scope and design of the systems. The deliverables will include the design principles, revisions requests, and ultimately the business requirements and training concepts necessary to be delivered within the scope of the project.

Program Manager

The Program Manager will monitor and drive details on the interdependent projects and activities that may affect the critical path to resourcing and delivering the EMS, RTC, BES, and DGR projects.



Program leadership met every 1 to 2 months as the "Passport Steering Committee" to review progress, discuss risks, and provide direction to the program.

G. Identify all funding sources and amounts for the program or function.

RTC funding came from favorable variances in revenue in ERCOT's budget for 2018 and 2019, which were designated by the PUCT to fund RTC. All other scope items (outside of RTC) were to be funded through normal capital project funding.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

The Passport Program contracted with two existing software vendors and an independent Delivery Assurance Consultant to aid the program's initiatives. These purposes of these expenditures are summarized below:

Contract Expenditures Summary	
Vendor 1	This contract is to aid in EMS upgrade development, testing, and support.
Vendor 2	This contract is to aid in MMS Market Design development, testing, and go-live support.
Vendor 3	This contract is to provide consulting services over the span of the program to review the controls, progress, and risks of the program and provide delivery assurance assessments for the program leadership.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $1,254,000.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

As noted above, the EMS Upgrade was decoupled from the Passport Program and is still moving forward as its own project; the Passport market design (RTC, ESR, DGR, and ECRS) has been placed on hold for at least one year as new delivery sequences are being evaluated.

More details on the Passport Program may be found at this link.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Client Services**
Location/Division	Taylor / Client Services
Contact Name	Ted Hailu
Number of FTEs as of FY 2020	15
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Client Services program is responsible for management of ERCOT's relationship with Market Participants and addressing the needs of Market Participants concerning all aspects of the ERCOT retail and wholesale markets.

Major Activities:

The Client Services Program provides the following key services:

- **Single Point of Contact**: Client services representatives are assigned to each Market Participant as a single point of contact for communication with ERCOT related to its operational interactions with ERCOT.

- **Registration / Qualification**: Client services representatives assist prospective Market Participants with registration and qualification processes needed for entry into the ERCOT market, and assist those already in the market with changes to registration and qualification status.

- **Communication / Issue management**: Client services representatives support communications between ERCOT and Market Participants to resolve issues that Market Participants may have in their operational interactions with ERCOT.

- **Dispute resolution**: Client services representatives manage the resolution of financial settlement disputes.

- **Education**: Client services representatives provide transparency into the ERCOT market rules, processes and procedures by delivering timely and accurate information tailored to the need of each Market Participant.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

• 13 client services representatives are assigned as single points of contact for approximately 1,200 Market Participants; i.e., each representative is assigned to and effectively manages the relationships with approximately 100 Market Participants.

• Client Services' satisfaction surveys in 2020 indicated that 95% of Market Participants were extremely satisfied or quite satisfied with their client services representative; that 98% of Market Participants found their account manager to be extremely responsive or quite responsive; and that 93% of Market Participants believed their account manager to be extremely knowledgeable or quite knowledgeable.

• In 2020, 100% of settlement and billing disputes were resolved on a timely basis in accordance with ERCOT Protocol timelines.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

ERCOT established its client services program at the inception of the ERCOT market more than 20 years ago. The need to provide a single point of contact for Market Participants as they navigate the complexities of the ERCOT market; to provide education on the rules, processes, and procedures; to provide transparency into the organization, its systems and market data; and to timely resolve all issues and disputes was a core part of the original design of the ERCOT organization and has remained an integral part of ERCOT's operations. Client Services' role has primarily stayed the same, with greater focus on supporting the needs of Market Participants as the rules, systems, and complexity of the market change at a faster pace.

In 2013, two programs that were formerly known as "Retail Client Services" and "Wholesale Client Services"—which, in essence, provided client services for Market Participants in the retail and wholesale markets, respectively—were merged into one "Client Services" program. This consolidation was done in large part because Retail Client Services was unable to support all operation interactions with retail Market Participants, who also had wholesale market issues for which they required support from Wholesale Client Services. Consolidation allowed Market Participants to have a single point of contact for all their operations interactions with ERCOT, on both the retail and wholesale side.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Client Services serves all Market Participants in the ERCOT market. The table below provides a breakdown of registered entities by Market Participant type:

Market Participant Type	No. of Market Participants
Load Serving Entities (LSE)	179
Resource Entities	517
Transmission and Distribution Service Providers (TDSP)	133
Congestion Revenue Rights Account Holders (CRRAH)	190
Qualified Scheduling Entities (QSE)	269
Independent Market Information System Registered Entities (IMRE)	225

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The program is administered by two managers and 13 client services representatives.

G. Identify all funding sources and amounts for the program or function, including federal grants and pass-through monies.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $2,526,800.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why

the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Market Support Services**
Location/Division	Taylor / Client Services
Contact Name	Ted Hailu
Number of FTEs as of FY 2020	6
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Market Support Services program is responsible for managing the ERCOT Market Participant registration system; facilitating the creation and delivery of ERCOT Market Notices; and managing digital certificates that are required for Market Participants to securely access various ERCOT systems.

Major Activities:

- **Market Participant Registration**: Market Support Services maintains the ERCOT Market Participant registration system, which is the source of record for all registration and qualification-related information on Market Participants.

- **Market Notices**: Market Support Services manages the creation and delivery of ERCOT Market Notices to Market Participants and to the general public. The program is the business owner of an e-mail list management system used by the Market Participants and the general public to self-subscribe to various channels of communication through which ERCOT delivers Market Notices required by the ERCOT Protocols, as well as other notices that ERCOT deems necessary to provide transparency into its operations.

- **Digital Certificates**: Market Support Services manages the digital certificates that are issued to Market Participants to allow secure access to ERCOT systems.

- **Electric Facts Labeling**: Market Support Services fulfills ERCOT's role as the registration agent in PUCT Substantive Rule 25.475 to create and maintain a database of generator scorecards reflecting fuel mix and environmental impact data for generating facilities in the state of Texas, which is required to support the labeling of renewable content of products offered by Retail Electric Providers.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

In 2020, Market Support Services:

- processed approximately 4,000 documents submitted by Market Participants regarding, *inter alia*, new registration data; registration of new generation or load resources; notices of changes of information; ERCOT agency agreements; and notices of suspension of operations;

- coordinated the creation, editing, approval, and distribution of more than 500 Market Notices;

- issued approximately 350 new digital certificates to User Security Administrators for Market Participants that registered to enter the ERCOT market; and

- resolved more than 200 issues reported by Market Participants related to the creation, use, and renewal of user digital certificates.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The functions performed by Market Support Services, although always termed "market support services," were previously subsumed under Wholesale Client Services (now, Client Services). In 2019, this function was pieced out into what is now separately run as the "Market Support Services" program. Market Support Services' role has primarily stayed the same over the years, with a continued focus on supporting the increasing complexity of registration data and Market Participant communication.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Market Support Services serves all Market Participants in the ERCOT market, as broken down below:

Market Participant Type	No. of Market Participants
Load Serving Entities (LSE)	179
Resource Entities	517
Transmission and Distribution Service Providers (TDSP)	133
Congestion Revenue Rights Account Holders (CRRAH)	190
Qualified Scheduling Entities (QSE)	269
Independent Market Information System Registered Entities (IMRE)	225

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The program is administered by one manager and five client services analysts.

G. Identify all funding sources and amounts for the program or function, including federal grants and pass-through monies.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $865,811.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; the top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws?

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Market Training**
Location/Division	Taylor / Client Services
Contact Name	Ted Hailu
Number of FTEs as of FY 2020	5
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

The Market Training program is responsible for the development and delivery of training to Market Participants and to the general public regarding market rules and processes related to ERCOT grid and market operations. Training is an integral component of the market services that ERCOT provides to Market Participants and the general public. ERCOT offers instructor-led and web-based training on a wide array of subjects including transmission system operations, wholesale market operations, and retail market operations.

Major Activities:

- **Market Participant training development**: The Market Training program develops training courses designed to deliver knowledge on ERCOT market operations, from introductory topics for general audiences, management, and support personnel, to advanced topics for specialists across all facets of grid and market operations.

- **Market Participant training delivery**: The Market Training program delivers training courses to Market Participants and the general public through structured, instructor-led sessions and web-based training formats available on-demand.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

In 2020, the Market Training program:

- maintained a catalog of 16 instructor-led and 24 web-based training courses;
- delivered instructor led training courses to approximately 600 attendees; and
- delivered web-based training courses to more than 4,000 students.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

The training functions now performed by Market Training were initially a part of the Client Services program. In 2011, as ERCOT transitioned from a Zonal Market to a Nodal Market, the transition team formed a group of both ERCOT and contract personnel dedicated to the development and delivery of market training. This team developed a curriculum of training courses and delivered training to Market Participants as they prepared themselves for the change. When the Nodal Market was implemented in 2011, ERCOT took over the maintenance of the training program, which proved to be too large a task for Client Services to incorporate into their support services. A Market Training program dedicated to the development and delivery of training was accordingly created to take over this function as the Nodal Market transition team was dissolved.

Since its creation, Market Training's role has primarily stayed the same, with a continued focus on keeping its catalog of training courses aligned with changes in market rules and meeting the challenge of developing and delivering training to a growing number of Market Participants.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

ERCOT Market Training courses are open to all Market Participants, as well as the general public.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

Market Training is administered by one manager, two market training instructors, one instructional systems administrator, and one instructional systems developer.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,150,432.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

Not applicable.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; the top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Cybersecurity**
Location/Division	Taylor / Critical Infrastructure Security
Contact Name	Mike Allgeier
Number of FTEs as of FY 2020	14
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

To protect assets owned by and entrusted to ERCOT and to enable ERCOT's business objectives.

Major Activities:

The Cybersecurity program consists of the following functional areas: Threat Operations and Intelligence, Security Architecture, and Cybersecurity Administration. The major activities for each of the functional areas are described below.

Threat Operations and Intelligence

- Manages Enterprise Security Operations;
- Operates and tunes the security toolsets, including security information and event management (SIEM), intrusion Detection/Protection system (IPS), application whitelisting solution, endpoint detection and response toolset (EDR), and endpoint protection solution (AV), email gateway;
- Provides security monitoring and response;
- Escalates and coordinates responses to emerging threats (e.g., zero-days, Market Participant compromises);
- Leads cyber incident response;
- Develops and leads cyber security investigations, forensics, and threat hunting;
- Develops and implements security awareness and training; and
- Provides security metrics and trend reports.

Security Architecture

- Provides non-functional security requirements for all capital projects and operations and maintenance initiatives;

- Ensures projects implement required security controls;

- Ensures that security is built in up-front for ERCOT projects, which results in lower costs and a greater return on investment;

- Performs security risk assessments on all new vendors and new categories of ERCOT purchases;

- Evaluates and approves all firewall changes within the ERCOT enterprise to ensure secure configurations;

- Evaluates and approves all system-level service accounts so that only necessary permissions are leveraged;

- Evaluates and approves all software installed on ERCOT workstations;

- Establishes Secure Configurations for new cyber asset types;

- Maintains and improves ERCOT's cyber governance policy documents; and

- Serves as a core member of the Patch Review Board to review and ensure timely application of security patches.

Security Administration

- Implements and maintains all ERCOT security toolsets;

- Manages ERCOT's vulnerability management program;

- Performs vulnerability assessment and secure configuration scans on all new ERCOT system builds so that they are fully secure prior to going into production;

- Performs system-hardening checks on all IT baseline changes so that changes do not negatively impact system security; and

- Engages as part of ERCOT's Change Advisory Board (CAB) to ensure all changes are secure.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

Through its Cybersecurity program, ERCOT has successfully mitigated and prevented cybersecurity threats through the effective implementation and operation of its cybersecurity program. The Cybersecurity program's effectiveness and efficiency is ensured and verified by the following:

• **Regular Internal Reviews:** Cybersecurity monitoring metrics are produced on a monthly and quarterly basis and regularly reviewed by management so that the program remains effective and efficient.

• **Third-Party Assessments:** ERCOT has undergone several third party NIST CyberSecurity Framework (CSF) assessments to ensure the efficacy of its Cybersecurity program.

• **Internal Audits:** ERCOT's Internal Audit department performs at least one audit per year focused specifically on the cybersecurity program, and all audits for other areas of ERCOT contain a cybersecurity section to ensure the program controls are being applied to and followed across the organization.

• **SOC1 Audits:** An annual SOC1 audit is performed to ensure ERCOT's internal controls provide for a valid financial reporting. Many of these controls leverage the Cybersecurity program.

• **Federal:** ERCOT must also adhere to the North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) Standards and Payment Card Industry (PCI) compliance requirements.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

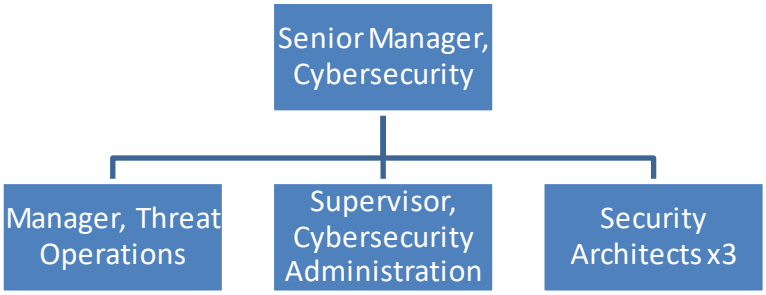
The Cybersecurity program – previously termed Grid Security – was established at ERCOT's inception and was reorganized as a separate program in 2005. Although the program has grown over the years, it has not materially deviated from its original intent.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The ERCOT Cybersecurity program affects ERCOT's infrastructure and personnel and, accordingly, is integral to the functioning of the entire ERCOT market.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

The ERCOT Cybersecurity program is administered by a Senior Manager who oversees the Threat Operations Manager, the Cybersecurity Administration Supervisor, and three Security Architects.



G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $3,906,468.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

ERCOT Cybersecurity partners with several federal and state agencies, as well as other industry entities to optimize Threat Intelligence Sharing. These include, but are not limited to, the Federal Bureau of Investigations (FBI); federal Department of Homeland Security Cybersecurity & Infrastructure Security Agency (CISA); federal Department of Energy; Texas Grid Security Council; Texas Department of Information Resources; Texas Department of Public Safety; Williamson, Travis and Bastrop County offices; local police departments; Multi-State Information Sharing and Analysis Center (MS-ISAC); and Electricity Sector Information Sharing and Analysis Center (E-ISAC).

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

The Cybersecurity program contracts with third parties for security assessments, compliance-gap assessments, application tool template creation, and contract low-level security tasks. These expenditures are summarized as follows:

Contract Expenditures Summary	
Vendor 1	This contract is to ensure regulatory cyber security compliance.
Vendor 2	This contract is to ensure the security of ERCOT systems against evolving threats.
Vendor 3	This contract is to help ensure the security of ERCOT systems.
Vendor 4	This contract is to help ensure the security of ERCOT systems.

FY 2020 Expenditures: For Fiscal Year 2020, these expenditures totaled $298,711.

Procurement/Accountability: ERCOT's procurement and human resources departments coordinate these services and ensure accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent.

Contracting Problems: There have been no contracting problems to date.

This response covers only contract expenditures concerning outside services. Information concerning license/subscription fees will be provided upon request.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

It would be helpful to have legislation mandating a breach notification if a third-party breach has a reasonable expectation of negatively impacting ERCOT to help ensure the security of the ERCOT system and integrity of the electric grid. Several states have breach requirements for loss of Personal Identifiable Information, but there is a broader need for third parties to provide notice of any breach that could negatively impact ERCOT, such as a supply chain issue where software updates could be weaponized (i.e., the SolarWinds breach).

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

A. Provide the following information at the beginning of each program description.

Name of Program or Function	**Critical Infrastructure Protection (CIP) & Corporate Compliance**
Location/Division	Taylor / Compliance
Contact Name	Chad Thompson
Number of FTEs as of FY 2020	7
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Critical Infrastructure Protection (CIP) and Corporate Compliance monitors how well ERCOT business operations meet regulatory, external audit, and internal process obligations. These obligations include North American Electric Reliability Corporation (NERC) Critical Infrastructure for grid operations systems, System and Organization Controls (SOC) audit of financial settlements and billing of the ERCOT market, and Committee of Sponsoring Organizations of the Treadway Commission (COSO) controls for risk management, governance, and fraud deterrence.

Major Activities:

- Conduct training for employees on regulatory and audit requirements and internal controls;
- Maintain a program for analyzing and reporting compliance issues, including recommendations for corrective actions founded on prior issues, trends, and patterns;
- Perform analysis of controls, processes, procedures, and evidence to identify gaps and risks in meeting regulatory, external audit, and internal process obligations;
- Stay ahead of developing rules and regulations, and coordinate with the ERCOT legal department on comments and balloting of new rules and regulations;
- Coordinate the implementation of new rules and regulations, and develop plain language interpretations to aid in implementation;
- Coordinate preparation of materials and liaise with external auditors; and
- Consult on projects and other areas as needed.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

- ERCOT is registered with NERC for six functions and must be compliant with 11 CIP standards, equating to 226 requirements (as of 2020). The number of standards and requirements will increase when FERC approves more standards and modifies existing standards. CIP and Corporate Compliance prepares all supporting documentation for NERC audit and ensures that ERCOT is otherwise prepared for audit.

- The CIP and Corporate Compliance program identifies possible non-compliance with the NERC standards and helps ERCOT self-report and develop mitigation plans. The Compliance function also helps ERCOT develop mitigation plans for potential notices of non-compliance identified by NERC from Final Audit Reports and Final Compliance Violation Investigation reports.

- In addition to the increased number of approved standards, the current approved standards and requirements are undergoing revision and are changing through the NERC Standards Revisions process. The ERCOT compliance function is responsible for participating the drafting and balloting of new standards and requirements.

- ERCOT has a compliance engagement with NERC every year and must be compliant with all FERC-approved standards and requirements. The CIP and Corporate Compliance function is to ensure that ERCOT is prepared for audits of CIP requirements.

- ERCOT is audited by an external system and organization control (SOC) audit each year and must be compliant with all defined controls. CIP and Corporate Compliance ensures that ERCOT is prepared for SOC audits.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

ERCOT centralized its compliance responsibilities in 2008. The Compliance and Security division now carries out these functions and is headed by a Chief Compliance Officer (CCO). The CCO is responsible for ERCOT ISO compliance and for reporting all compliance activities to the ERCOT Board. Given the advancement and complexities that have evolved with NERC CIP Standards, the CIP and Corporate Compliance program was implemented in 2018. It combined the Internal Controls Management Program and the CIP monitoring program into a single area of focus.

CIP and Corporate Compliance monitors how well ERCOT business operations meet regulatory, external audit, and internal process obligations. These obligations include NERC Critical Infrastructure (CIP) for grid operations systems, SOC audits of financial settlements and billing of the ERCOT market, and Committee of Sponsoring Organizations of the Treadway Commission (COSO) controls for risk management, governance, and fraud deterrence.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

The CIP and Corporate Compliance program affects the whole of the ERCOT organization through the demonstration of a culture of reliability and security, and by ensuring compliance with relevant regulatory, external audit, and internal control obligations.

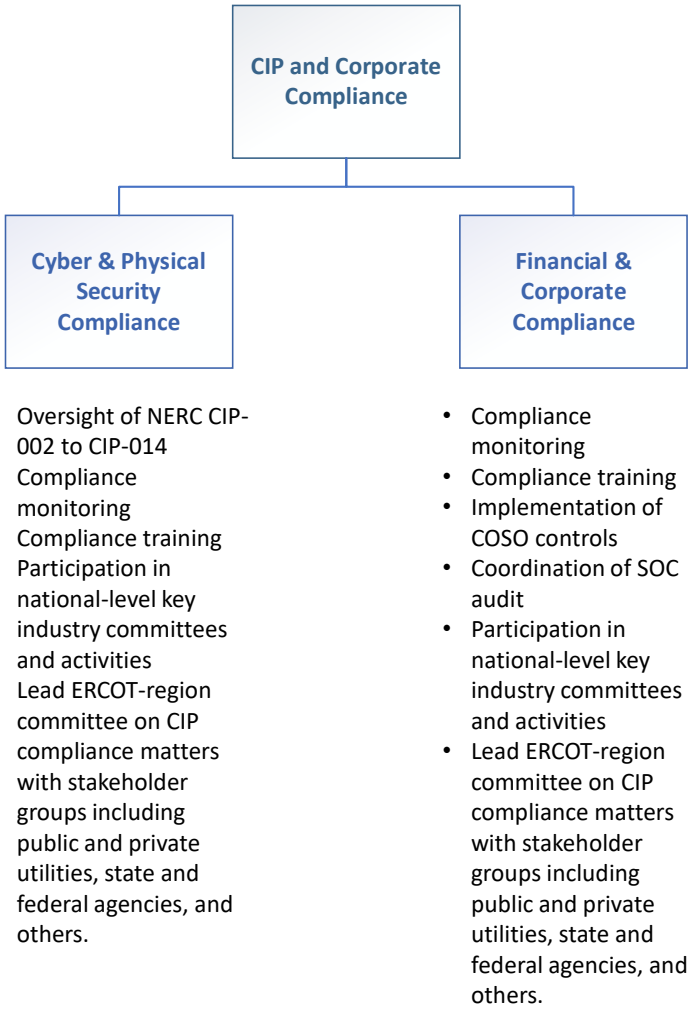
F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and seven full-time employees.

All FERC, NERC, and Regional Entity (Texas Reliability Entity) functions for the NERC CIP Reliability Standards are administered as per the NERC Rules of Procedure, which includes the following:

- Audits and associated documentation
- Spot Checks
- Self-reporting
- Event Driven Reports
- Compliance Monitoring
- Enforcement Program and Settlements
- Requests for Information (RFI)
- Compliance Violation Investigation (CVI)
- Organization Registration and Certification
- Reliability Readiness Evaluation and Improvement

A breakdown of the functions performance by this program is pictured below:



The System and Organization Controls (SOC) audit of financial settlements and billing of the ERCOT market is performed by a third-party auditing firm. CIP and Corporate Compliance is the liaison with the external audit firm and coordinator for ERCOT staff.

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,396,932.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

The North American Electric Reliability Corporation (NERC) is the regulatory body that sets regulatory requirements and monitors the NERC Critical Infrastructure Protection regulatory requirements at the national level. As described above, CIP and Corporate Compliance is subject to NERC Reliability Standards and must demonstrate compliance with these standards, including by preparing ERCOT for NERC audit. Additionally, ERCOT, through this program, participates in the drafting of these regulatory requirements.

The Texas Reliability Entity is the NERC Regional Entity that monitors the NERC Critical Infrastructure Protection regulatory requirements at a local level.

K. If contracted expenditures are made through this program please provide a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

CIP and Corporate Compliance maintains one outside contract, as summarized below:

	Description
Vendor 1	This contract is to provide services for the System and Organization Controls audit of financial settlements and billing of the ERCOT market.

Procurement/Accountability: ERCOT's procurement department coordinates these services and ensures accountability. Program managers are also responsible for ensuring that contracts are completed in an acceptable manner and that the funds utilized in these contracts are appropriately spent. The SOC audit report and external auditor are reviewed and accepted each year by the ERCOT Board of Directors

Contracting Problems: There have been no contracting problems to date.

L. Provide information on any grants awarded by the program.

Not applicable.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

Name of Program or Function	**Operations & Planning Compliance**
Location/Division	Taylor / Compliance
Contact Name	Chad Thompson
Number of FTEs as of FY 2020	8
Statutory Citation for Program	N/A

B. What is the objective of this program or function? Describe the major activities performed under this program.

Objective:

Operations and Planning Compliance monitors and documents how well ERCOT operations meet regulatory, external audit, and internal process obligations. These obligations include North American Electric Reliability Corporation (NERC) Operations and Planning for grid operations systems and ERCOT Protocol Compliance.

Major Activities:

- Perform analysis and prepare a quarterly report for the PUCT regarding compliance by Market Participants with ERCOT Protocols and monitor implementation of corrective actions by Market Participants who are found to be non-compliant;

- Conduct training for employees on regulatory and audit requirements and internal controls;

- Maintain a program for analyzing and reporting compliance issues, including recommendations for corrective actions founded on prior issues, trends, and patterns;

- Perform analysis of controls, processes, procedures, and evidence to identify gaps and risks in meeting regulatory, external audit, and internal process obligations;

- Stay ahead of developing rules and regulations, and coordinate with ERCOT legal department on comments and balloting of new rules and regulations;

- Coordinate the implementation of new rules and regulations and develop plain language interpretations to aid in implementation;

- Coordinate preparation of materials and liaise with external auditors; and

- Consult as needed on projects and other areas.

C. What evidence can you provide that shows the effectiveness and efficiency of this program or function?

- ERCOT is registered with NERC for six functions and must be compliant with 46 Operations and Planning standards equating to 472 requirements (as of 2020). The number of standards and requirements will increase when FERC approves more standards and modifies existing standards. The Operations and Planning Compliance department prepares all supporting documentation for the NERC audit and ensures that ERCOT is prepared for the audit.

- The Operations and Planning Compliance program also identifies possible non-compliance with the NERC standards and helps ERCOT self-report and develop mitigation plans.

- In addition to the increase in approved standards, the current approved standards and requirements are undergoing revision and are changing through the NERC Standards Revisions process. The ERCOT Compliance function is responsible for participating in the drafting and balloting of new standards and requirements.

- ERCOT has a compliance engagement with NERC every year and must be compliant with all FERC-approved standards and requirements. The Operations and Planning Compliance function is to ensure that ERCOT is prepared for audits of Operations and Planning requirements.

D. Describe any important history regarding this program not included in the general agency history section, including how the services or functions have changed from the original intent.

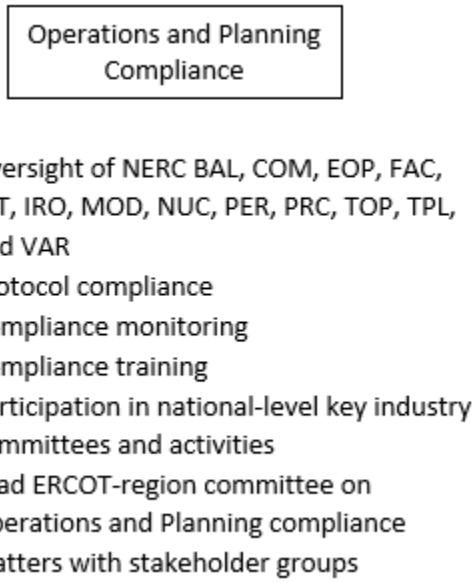
ERCOT centralized its compliance responsibilities in 2008. The Compliance and Security division now carries out these functions and is headed by a Chief Compliance Officer (CCO). The CCO is responsible for ERCOT ISO compliance and for reporting all compliance activities to the ERCOT Board. Given the advancement and complexities that have evolved with NERC CIP Standards, the CIP and Corporate Compliance program was implemented in 2018, splitting off from the Operations and Planning Compliance program.

E. List any qualifications or eligibility requirements for persons or entities affected by this program, such as licensees, consumers, landowners, for example. Provide a statistical breakdown of persons or entities affected.

Operations and Planning Compliance affects the whole of the ERCOT organization. Operations and Planning Compliance demonstrates a culture of reliability and security and by ensures the organization is compliant with relevant regulatory, external audit, and internal control obligations.

F. Describe how your program or function is administered, including a description of the processes involved in the program or function.

This program is administered by a manager and seven full-time employees. The table below lists the primary duties of Operations and Planning Compliance.



All FERC, NERC and Regional Entity (Texas Reliability Entity, *see infra*, Question J) functions for the NERC Operations and Planning Reliability Standards are administered as per the NERC Rules of Procedure, which include the following:

- Audits and associated documentation
- Spot Checks
- Self-reporting
- Event Driven Reports
- Compliance Monitoring
- Enforcement Program and Settlements
- Requests for Information (RFI)
- Compliance Violation Investigation (CVI)
- Organization Registration and Certification
- Reliability Readiness Evaluation and Improvement

G. Identify all funding sources and amounts for the program or function.

The program is funded by the ERCOT system administration fee. Budgeted expenditures for Fiscal Year 2021 total $1,387,622.

H. Identify any programs, internal or external to your agency, that provide identical or similar services or functions to the target population. Describe the similarities and differences.

There are no other programs that provide identical or similar services or functions in the ERCOT region.

I. Discuss how the program or function is coordinating its activities to avoid duplication or conflict with the other programs listed in Question H and with the agency's customers.

Not applicable.

J. If the program or function works with local, regional, or federal units of government, include a brief description of these entities and their relationship to the agency.

North American Electric Reliability Corporation (NERC) is the regulatory body that sets regulatory requirements and monitors the NERC Operations and Planning regulatory requirements at the national level. The Texas Reliability Entity is the regulatory body that monitors the NERC Operations and Planning requirements at a local level.

Operations and Planning Compliance routinely works with these organizations, including participating in the drafting and balloting of new NERC standards and requirements, ensuring ERCOT is compliant with all NERC standards and requirements, self-reporting possible non-compliance, developing mitigation plans, supporting documentation for an annual NERC audit, and preparing ERCOT for the audit.

K. If contracted expenditures are made through this program please provide; a short summary of the general purpose of those contracts overall; the amount of those expenditures in fiscal year 2020; the number of contracts accounting for those expenditures; the method used to procure contracts; top five contracts by dollar amount, including contractor and purpose; the methods used to ensure accountability for funding and performance; and a short description of any current contracting problems.

None.

L. Provide information on any grants awarded by the program.

None.

M. Are there any barriers or challenges that impede the program's performance, including any outdated or ineffective state laws? Explain.

There are currently no barriers or challenges that impede this program's performance.

N. Provide any additional information needed to gain a preliminary understanding of the program or function.

None.

O. Regulatory programs relate to the licensing, registration, certification, or permitting of a person, business, or other entity. For each regulatory program, if applicable, describe; why the regulation is needed; the scope of, and procedures for, inspections or audits of regulated entities; follow-up activities conducted when non-compliance is identified; sanctions available to the agency to ensure compliance; and procedures for handling consumer/public complaints against regulated entities.

Not applicable.

P. For each regulatory program, if applicable, provide detailed information on complaint investigation and resolution.

Not applicable.

VIII. Statutory Authority and Recent Legislation

A. Fill in the following charts, listing citations for all state and federal statutes that grant authority to or otherwise significantly impact your agency. Do not include general state statutes that apply to all agencies, such as the Public Information Act, the Open Meetings Act, or the Administrative Procedure Act. Provide information on Attorney General opinions from FY 2015–2020, or earlier significant Attorney General opinions, that affect your agency's operations.

Statutes / Attorney General Opinions

Statutes

Citation / Title	Authority / Impact on Agency
Federal	
Federal Power Act ("FPA") – 16 U.S.C. § 824k	Defining "ERCOT" and "ERCOT Utility"; directing that any FERC order requiring the provision of transmission services within ERCOT shall provide that any ERCOT Utility is entitled to receive compensation based on PUCT ratemaking methodology.
FPA §§ 824k, 824q, 824t	Carving out ERCOT from FERC requirements governing siting of interstate transmission facilities, native load service obligations, and electricity market transparency, respectively.
FPA § 824o	Calls upon FERC to certify an Electric Reliability Organization (ERO) – currently the North American Electric Reliability Corporation (NERC) – to develop and enforce mandatory electric reliability standards under FERC's oversight. The standards apply to all users, owners and operators of the bulk-power system, including ERCOT.
Energy Policy Act of 2005 (42 U.S.C. § 15801 et seq.)	Requiring development of mandatory FERC-approved electric reliability standards (previously voluntary industry standards); added FPA Section 824o, requiring FERC creation of an ERO to establish and enforce such standards.
State	
Public Utility Regulatory Act (PURA) § 39.151	ERCOT enabling statute.
PURA § 31.002	Defining "ERCOT" and the "independent system operator."
PURA § 39.1511	Setting forth ERCOT public meeting requirements.
PURA § 39.1512	Governing disclosure of ERCOT Board member conflicts of interest.
PURA § 39.1513	Outlining composition and duties of ERCOT Board Selection Committee.
PURA § 39.1515	Requiring that ERCOT contract with an independent entity selected by the PUCT to monitor the wholesale market (currently, the Independent Market Monitor).
PURA § 39.1516	Requiring that ERCOT contract with an entity selected by the PUCT to monitor cybersecurity concerns in the ERCOT market.
PURA § 39.152	Setting forth requirements for qualified power regions.

Citation / Title	Authority / Impact on Agency
PURA § 39.155	Requiring that ERCOT submit an annual report to the PUCT identifying existing and potential transmission and distribution constraints and system needs.
PURA § 39.159	Requiring that ERCOT (1) establish requirements to meet the reliability needs of the ERCOT region; (2) determine annually the quantity and type of ancillary services needed to ensure grid reliability and procure those services; and (3) develop performance requirements for providing ancillary services.
PURA § 39.160	Establishing an emergency pricing program for the wholesale electric market.
PURA §§ 39.601-.609 (Subchapter M)	Authorizing default charges in connection with securitization of the default balance owed to ERCOT by wholesale Market Participants from the February 2021 extreme winter weather event.
PURA §§ 39.651-.64 (Subchapter N)	Authorizing uplift charges in connection with securitization of uplift balance to provide liquidity to certain wholesale Market Participants related to the cost of electricity during the February 2021 extreme winter weather event.
PURA § 39.904	Setting forth the State's goals for renewable energy, administered by ERCOT through the Renewable Energy Credit Program; requiring that ERCOT submit a biennial report outlining the need for increased transmission and generation capacity.
PURA § 39.914	Requiring ERCOT to develop settlement procedures to account for distributed solar generation purchased from a school district.
PURA § 39.916	Requiring ERCOT to account for Distributed Renewable Generation.
PURA § 39.9165	Requiring ERCOT to ensure Distributed Generation reporting.
PURA § 39.917	Creating Texas Electric Grid Security Council to mitigate risks of cyber and physical attacks on the Texas power grid; appointing ERCOT CEO as a Council member.
PURA §§ 35.0021, 38.075	Setting forth ERCOT obligations with to inspect generation, transmission and distribution facilities weather emergency preparedness.
PURA § 35.004	Requiring each electric utility, transmission and distribution utility, electric cooperative, municipally owned utility, and generation provider to comply with ERCOT reliability standards.
PURA § 38.077	Requiring ERCOT to conduct load shedding exercises.
PURA §§ 38.201-204	Creating Texas Electricity Supply Chain Security and Mapping Committee; appointing ERCOT CEO as a Committee member; setting forth duties and functions.
Tex. Util. Code § 35.0021	Requiring ERCOT to inspect generation providers for compliance with weatherization standards.
Tex. Util. Code § 38.075	Requiring ERCOT to inspect transmission service providers for compliance with weatherization standards.

Attorney General Opinions

Attorney General Opinion No.	Impact on Agency
Opinion No. KP-0363	Construing PURA Section 39.151(d) as likely "to allow the Public Utility Commission to order ERCOT to correct prices for wholesale electricity and ancillary services."
Opinion No. OR2021-13431	Outlining categories of ERCOT information that may be disclosed by the PUCT under the Public Information Act.

B. Provide a summary of significant legislation regarding your agency by filling in the charts below or attaching information already available in an agency-developed format. Briefly summarize the key provisions. For bills that did not pass but were significant, briefly explain the key provisions and issues that resulted in failure of the bill to pass.

87th Legislative Session

Legislation Enacted

Bill Number	Author	Summary of Key Provisions
SB 2	Hancock	Relating to the governance of the Public Utility Commission, the Office of Public Utility Counsel, and ERCOT. As it pertains to ERCOT, the bill significantly changes the composition of ERCOT's Board of Directors, transitioning the Board from a hybrid makeup of industry participants and unaffiliated members, to a Board comprised of 8 fully independent members. The bill directs that these members must be residents of Texas who have executive-level experience in one of seven specified professions. The bill further establishes an ERCOT Board Selection Committee, to be comprised of three members: one appointed by the Governor, one appointed by the Lieutenant Governor, and one appointed by the Speaker of the House. This Committee is to utilize an outside consulting firm to help select ERCOT Board members and is to appoint ERCOT's Chair and Vice Chair. The law took effect immediately upon the Governor's signature on June 8, 2021.
SB 3	Schwertner	Relating to preparing for, preventing, and responding to weather emergencies and power outages. This bill includes a number of changes directed at preparing the Texas power grid for future extreme weather events. In key part, the bill: (1) requires the weatherization of power generation facilities, natural gas facilities, and transmission facilities to handle extreme weather; (2) requires ERCOT inspect these facilities for weatherization compliance; (3) directs ERCOT to procure sufficient ancillary services to ensure reliability during extreme weather events; (4) creates a power outage alert system; (5) formalizes the Texas Energy Reliability Council, responsible for improving coordination between ERCOT, various state agencies, and the electric industry; (6) establishes an emergency pricing program for the wholesale electric market; and (7) improves upon load shedding protocols, including by directing ERCOT to conduct simulated load shedding exercises. The law took effect immediately upon the Governor's signature on June 8, 2021.

Bill Number	Author	Summary of Key Provisions
HB 16	Hernandez, Paddie, Hunter, Morales Shaw	Relating to the regulation of certain retail electric products. This bill prohibits retail electric providers from offering residential or small commercial customers a wholesale indexed product in which the price the customer pays for electricity includes a direct pass-through of real-time settlement point prices. Such pricing arrangements may only be offered to large commercial customers after the provider obtains the customer's signed acknowledgement of the fluctuations in wholesale energy prices. The law takes effect on September 1, 2021.
SB 2154	Schwertner	Relating to the membership of the PUCT. This bill increased the number of PUCT commissioners from three to five, and made changes to commissioner qualifications, including the requirement that PUCT commissioners be residents of Texas. The law took effect immediately upon the Governor's signature on June 18, 2021.
SB 713	Buckingham	This bill moved the Sunset Review of ERCOT, the PUCT, and OPUC from the 2024-2025 biennium to the 2022-2023 biennium.
SB 1281	Hancock	Relating to a reliability assessment of the ERCOT power grid and certificates of public convenience and necessity for certain transmission projects. This bill requires ERCOT to conduct a biennial assessment of the ERCOT power grid to assess the grid's reliability in extreme weather scenarios. The bill additionally directs the transmission planning process towards the goal of lowering costs for customers. The law takes effect on September 1, 2021.
HB 3648	Geren	Relating to an annual audit of the independent organization certified for the ERCOT power region. This bill requires the PUCT to conduct an annual external audit of (1) ERCOT's financial condition, including its budget, expenses and compensation; and (2) ERCOT's compliance with all applicable PUCT standards. The results of the audit must be published online and submitted to the Legislature. The law takes effect on September 1, 2021.
HB 4492	Paddie	Relating to financing certain costs associated with electric markets. This bill authorizes the securitization financing of (1) up to $800 million of the default balance; and (2) up to $2.1 billion of the uplift balance relating to the cost of electricity and amounts owed from the period of the February 2021 extreme winter weather event. The bill also requires ERCOT to report to the PUCT if a Market Participant fails to pay amounts owed to ERCOT so that the PUCT may take action against them, including by not allowing them to continue to be a Market Participant in the ERCOT power region. The law took effect immediately upon the Governor's signature on June 16, 2021.

Bill Number	Author	Summary of Key Provisions
SB 1580	Hancock	Relating to the use of securitization by electric cooperatives to address certain weather-related extraordinary costs and expenses. This allows electric cooperatives to securitize their share of the charges outlined above. The bill also requires ERCOT to report to the PUCT if a Market Participant fails to pay amounts owed to ERCOT so that the PUCT may take action against them, including by not allowing them to continue to be a Market Participant in the ERCOT power region. The law took effect immediately upon the Governor's signature on June 18, 2021.

Legislation Not Passed

Bill Number	Author	Summary of Key Provisions / Reason Bill Did Not Pass
HB 11	Paddie	This bill would have required each provider of generation in the ERCOT power region to implement measures to ensure adequate electric generation during extreme weather emergencies and make all reasonable efforts to prevent service interruptions during these extreme weather events. Similar weatherization requirements were instead passed under SB 3.
HB 10	Paddie	These bills provided various alternative proposals for changing the makeup of ERCOT's Board. Ultimately, however, the Board changes set forth in SB 2 were adopted.
HB 2467	Price	
HB 2529	Yvonne	
HB 2544	Dominguez	
HB 3468	Hinojosa	
SB 1624	Miles	
HB 3062	Thierry	
HB 13	Paddie	This bill would have created the Texas Energy Disaster Reliability Council to prevent extended natural gas supply failures and/or power outages during disasters; coordinate the delivery of natural gas in a disaster; and study and report to the Legislature on the reliability of the Texas electric supply chain. The council would have included the ERCOT President and CEO as one of its members. The bill passed the House but was left pending in the Senate Committee on Jurisprudence after a hearing.
HB 14	Goldman	This bill would have created the Texas Electricity Supply Chain Mapping Committee tasked with mapping Texas's electricity supply chain and natural gas delivery system; identifying critical infrastructure sources in those systems; and establishing practices to prepare electric and natural gas providers for extreme weather events. The committee would have included the ERCOT President and CEO as one of its members, and would have further required ERCOT to provide staffing as necessary to carry out the committee's duties. The bill passed the House but was left pending in the Senate Committee on Jurisprudence after a hearing.
HB 1607	Darby	This bill would have modified the criteria used by the ERCOT and PUCT in the transmission planning and approval process. The bill passed the House but was never referred to committee in the Senate.

Bill Number	Author	Summary of Key Provisions / Reason Bill Did Not Pass
HB 1731	Tinderholt	This bill would have required ERCOT to consider electromagnetic field levels when determining the public need for a transmission line. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 1951	Patterson	This bill would have required ERCOT to adopt protocols and procedures to eliminate, or compensate for, any distortion in electricity pricing caused by a federal tax credit under 26 U.S.C. 45. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 1965	Beckley	This bill would have required ERCOT to contract with power generation companies for a defined amount of emergency reserve power generation capacity to prevent load shedding. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2470	Rodriguez	Similar to the above, this bill would have required ERCOT to adopt procedures and enter into contracts as necessary to ensure the availability of a defined amount of emergency reserve power generation capacity to prevent load shedding. The bill was also referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2050	Gonzalez, J.	This bill would have changed the threshold for each level of ERCOT Energy Emergency Alert. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2562	Pacheo	This bill would have decertified ERCOT as the Independent System Operator, and certified the Texas Railroad Commission as the ISO for the ERCOT region. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2686	Reynolds	This bill would have required ERCOT to interconnect with transmission facilities outside the state for the express purpose of allowing federal regulation of transmission services and sale of wholesale power in the ERCOT region. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2687	Reynolds	This bill sets forth alternative weatherization requirements than those contained in SB 3, and would have required ERCOT to contract with various qualified loads, electric storage companies, and power generation companies for a defined amount of emergency response capacity to avoid load shedding. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2785	Cody	This bill would have made ERCOT a "governmental body" subject to the Texas Public Information Act. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2816	Thierry	This bill would have required ERCOT to determine the amount of reserve capacity needed to maintain a 1 in 10 reliability standard in the ERCOT region. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2820	Thierry	This bill would have required ERCOT to submit a biennial analysis of potential demand response opportunity and penetration in the ERCOT region. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 2991	Morales Shaw	This bill would have required electric providers to exclude certain circuits from ERCOT-ordered load shedding, and prevented these providers from shedding load in an area for more than 12 hours in a 24-hour period. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.

Bill Number	Author	Summary of Key Provisions / Reason Bill Did Not Pass
HB 3166	Crockett	This bill would have limited the wholesale market cap during a state of disaster to an amount not to exceed 200 percent of the average daily peak price of wholesale energy sold in the previous 90 days. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 3177	Rosenthal	This bill would have authorized TDSPs, MOUs and electric co-ops to construct any facilities necessary to access transmission services and purchase wholesale power outside of the ERCOT region. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 3179	Rosenthal	This bill would have prohibited ERCOT from purchasing an amount of electricity from a generation facility that exceeds the facility's base generation capacity. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 3184	Rosenthal	This bill would have required ERCOT to use adaptive model data analytics software in generation forecasting in order to maintain ISO certification. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 3371	Ramos	This bill would have required ERCOT to annually develop a comprehensive emergency operations and weatherization plan satisfying certain enumerated criteria. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 3470	Thierry	As it directly impacts ERCOT, this bill would have changed the process by which ERCOT drafts and approves new protocols and would have required that ERCOT establish a new advisory committee to oversee this process. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 3700	Hernandez	This bill would have required every TDSP, MOU, and electric co-op to submit an annual report identifying the entity's peak load for the summer and winter seasons and required ERCOT to use this information to make annual determinations of load shed percentages. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 4236	Raymond	This bill would have mandated a target reserve margin of not less than 15 percent. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 4323	Larson	This bill would have required the PUCT to develop a plan to re-regulate the electric market in Texas. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
HB 4466	King	This bill would have required ERCOT to assign ancillary service costs arising from reliability issues of intermittent resources directly to those intermittent resources. The bill received a hearing in the House Committee on State Affairs, but was not voted out of committee.
HB 4502	Vasut	This bill would have required ERCOT to assign any capital costs incurred to interconnect with transmission system generation resources and electric energy storage resources directly to the generation resource or electric energy storage resource receiving interconnection service. The bill received a hearing in the House Committee on State Affairs, but was not voted out of committee.
HB 4512	Raymond	This bill would have prohibited the PUCT from raising wholesale energy prices during a state of disaster in response to an extreme weather event. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.

Bill Number	Author	Summary of Key Provisions / Reason Bill Did Not Pass
HB 4542	Martinez Fischer	This bill would have allowed MOUs to make requests, obtain approvals, enter into contracts, or construct facilities as necessary to access transmission and purchase wholesale power outside the ERCOT region. The bill was referred to the House Committee on State Affairs, but never received a committee hearing.
SB 2142	Hughes	This bill would have required the PUCT to order ERCOT to correct the prices of wholesale power and ancillary services sold in the ERCOT market during the February 2021 extreme winter weather event. The bill passed the Senate and was referred to the House Committee on State Affairs; it did not receive a hearing in State Affairs.
SB 2238	Schwertner	This bill would have changed the wholesale market cap from $9,000 per MWh to $3,000 per MWh. The bill was referred to the Senate Committee on Jurisprudence, but never received a committee hearing.
SB 28 (87(1))	Hall	This bill would have formed the Texas Grid Security Commission, upon which an ERCOT member would have served, to determine threats to and vulnerabilities of the electric grid. ERCOT would have been required to store and maintain all confidential information for the Commission. The bill was filed, but no further action was taken.
HB 161 (87(1))	Reynolds	This bill would have required the PUCT to identify transmission facilities in the ERCOT region that may be interconnected with transmission facilities outside the ERCOT region for the purposes of allowing federal regulation of transmission service and wholesale power sales in ERCOT. The bill was filed, but no further action was taken.
HB 277 (87(1))	Rosenthal	This bill would have authorized transmission and distribution utilities, municipally owned utilities, and electric cooperatives to construct and operate facilities as necessary to access transmission. The bill was filed, but no further action was taken.
HB 63 (87(1))	Beckley	This bill would have required ERCOT to submit a report to the PUCT if and when it ever determines that power supply is, or may be, inadequate to meet demand. The bill was filed, but no further action was taken.
HB 142 (87(1))	Dominguez	This bill would have further modified the ERCOT Board selection process and required that the ERCOT Board Selection Committee ensure that ERCOT's Board include members representing the various geographic regions of the State. The bill was filed, but no further action was taken.

IX. Major Issues

The purpose of this section is to briefly describe any potential issues raised by your agency, the Legislature, or stakeholders that Sunset could help address through changes in statute to improve your agency's operations and service delivery.

Promoting Grid Reliability

As outlined in Sections II, IV, and VIII above, ERCOT and the electric generation and transmission industry underwent significant reform during the recent 87th Regular Legislative Session. After the February 2021 extreme winter weather event, Governor Abbott made improving the reliability of the Texas power grid a top priority, and, in response, the Legislature passed comprehensive legislation enabling ERCOT to provide grid stability. In key part, that legislation:

- restructured ERCOT's Board of Directors in a manner that invites public involvement in appointments and allows for greater representation of residential customer interests;
- requires weatherization of electrical power generation and transmission facilities in the State and vests ERCOT and the PUCT with the ability to effectively enforce these weatherization requirements;
- provides for more robust planning and oversight of load shedding;
- allows ERCOT to procure ancillary services sufficient to meet the reliability needs of the market;
- bolsters electrical power generator reporting requirements to provide ERCOT with a fuller picture of power generation capacity and availability;
- authorizes the securitization of costs incurred by the market in connection with the February 2021 extreme winter weather event;
- establishes a statewide emergency alert system ensuring customers are aware of potential power outages; and
- formalizes the Texas Energy Reliability Council, charged with enhancing coordination among ERCOT, the PUCT, and the electric and natural gas industries to ensure the State's energy needs are met.

Since the session's end, ERCOT has worked diligently with the PUCT and other State leadership to implement these directives as quickly and efficiently as possible, as outlined in ERCOT's Roadmap to Improving Grid Reliability. Although these are not overnight changes, ERCOT believes it has been provided the tools needed to promote grid reliability moving forward and, as such, does not recommend further legislative changes at this time.

X. Other Contacts

A. Fill in the following charts with updated information on people with an interest in your agency, and be sure to include the most recent email address.

ERCOT Contacts

Interest Groups

Group or Association Name/ Contact Person	Address	Telephone	Email Address
Association of Electric Companies of Texas (AECT)/JP Urban	1005 Congress, Suite 600, Austin, TX 78701	512-474-6725	jp@aect.net
Alliancefor Retail Markets (ARM)/Carrie Collier-Brown	600 Congress Ave., Ste. 2200	512-305-4732	Carrie.CollierBrown@ lockelord.com
Gulf Coast Power Association (GCPA)/Kim Casey	2800 W. Whitestone Blvd. Ste 120 PMB 222, Cedar Park, TX 78613	713-306-1008	kcasey@gulfcoastpower.org
Public Citizen/Adrian Shelley	309 E 11th Street, Ste 2, Austin, TX 78701	512-477-1155	ashelley@citizen.org
Texas Energy Association for Marketers (TEAM)/Catherine Webking	303 Colorado Street, Suite 2400 Austin, TX 78701	512-495-6300	cwebking@scottdoug.com
Texas Advanced Energy Business Alliance (TAEBA)/Suzanne Bertin	P.O. Box 301151 Austin, TX 78703	512-739-4678	suzanne.bertin@texasadvancedenergy. org
Texas Competitive Power Advocates (TCPA)/Michele Richmond	n/a	512-653-7447	Michele@ competitivepower.org
Texas Electric Coooperatives, Inc. (TEC)/Julia Harvey	1122 Colorado Street, 24th Floor Austin, TX 78701	512-454-0311	jharvey@texas-ec.org
Texas Industrial Energy Consumers/Katie Coleman	500 W 2nd Street, Suite 1900 Austin, TX 78701	737-261-8625	kcoleman@omm.com
Texas Oil & Gas Association (TXOGA)/Todd Staples	304 W 13th Street Austin, TX 78701	512-478-6631	tstaples@txoga.org
Texas Public Power Association (TPPA)/Bob Kahn	PO Box 82768 Austin, TX 78708	512-472-5965	bkahn@tppa.com

Group or Association Name/ Contact Person	Address	Telephone	Email Address
Texas Renewables Energy Industries Association/Russel Smith	P.O. Box 16469, Austin, TX 78761	512-345-5446	rsmith@treia.org
Texas Solar Power Association (TSPA)/Charlie Hemmline	PO Box 1485 Austin, TX 78767	512-593-2015	Charlie@txsolarpower.org
Advanced Power Alliance (APA)/Jeff Clark	P.O. Box 28112 Austin, Texas 78755	512-651-0291	Jeff@poweralliance.org

Interagency, State, or National Associations

Group or Association Name/ Contact Person	Address	Telephone	Email Address
EPSA (Electric Power Supply Association)/Dan Dolan, Mgr. State & Regulatory Affairs	1401 New York Ave NW, 11th Floor Washington, D.C. 20005	202-349-0153	--
FERC (Federal Energy Regulatory Commission)/Julia Bovey, Director of External Affairs	88 First Street, NE Washington, D.C. 20426	202-502-8004	--
The ISO/RTO Council/Nick Brown, CEO of Southwest Power Pool	415 North McKinley, 140 Plaza West Little Rock, AR 72205	501-614-3337	--
North American Electric Reliability Corporation(NERC)/James B. Robb, President and CEO	1325 G Street, NW Suite 600, Washington, DC 20005	202-400-3000	--

Liaisons at Other State Agencies

Agency Name / Relationship / Contact Person	Address	Telephone	Email Address
Office of Public Utility Counsel/Chris Ekoh, Interim Public Counsel	1701 N. Congress Avenue, Suite 9-180, Austin, TX 78701	512-936-7500	Chris.Ekoh@opc.state.tx.us
Public Utility Commission of Texas/Thomas Gleeson, Executive Director	1701 N. Congress Avenue, P.O. Box 13326, Austin, TX 78711-3326	512-936-7040	Thomas.Gleeson@ puc.texas.org
Railroad Commission of Texas / Wei Wang, Executive Director	1701 N. Congress Avenue P.O. Box 12967 Austin, TX 78711-2967	512-463-7158	Wei.Wang@rrc.texas.gov
Texas Commission on Environmental Quality/ Toby Baker, Executive Director	PO Box 13087, Austin, TX 78711-3087	512-239-1000	Toby.Baker@tceq.texas.gov

XI. Additional Information

A. Include a list of each agency-specific report that the agency is required by statute to prepare and an evaluation of the need for each report based on whether factors or conditions have changed since the statutory requirement was put in place.

ERCOT - Evaluation of Agency Reporting Requirements

Report Title	Legal Authority	Due Date and Frequency	Recipient	Description	Is the Report Still Needed? Why?
Report on Rules Governing Conflicts of Interest	S.B.3 (87(R)), § 34	Annual	Legislature	PUCT and ERCOT are required to "review statutes, rules, protocols, and bylaws that apply to conflicts of interest for commissioners and for members of the governing body of the independent organization and submit to the legislature a report on the effects the statutes, rules, protocols, and bylaws have on the ability of the commission and the independent organization to fulfill their duties."	This report was introduced in the 2021 legislative session. ERCOT and the PUCT have not yet developed the first version of the required report. ERCOT and the PUCT will have a better understanding of the value of providing this report on a recurring basis after developing the initial version.
Report on Compliance with Cybersecurity and Information Security Laws	PURA § 39.151(o)(2)	Annual	PUCT	Addresses "the independent organization's compliance with applicable cybersecurity and information security laws."	This report was added by 2019 legislation and facilitates the PUCT's oversight of ERCOT's operations. ERCOT would need more experience with this reporting requirement to form an opinion on its continued necessity, and believes the PUCT is in a better position to opine on the report's value.
Report on transmission constraints and needs	PURA § 39.155(b)	January 15, annual	PUCT	Identifies existing and potential transmission and distribution constraints and system needs within ERCOT, alternatives for meeting system needs, and recommendations for meeting system needs	This report is probably not needed. ERCOT's identification of transmission needs is based on its established system planning procedures. *See, e.g., supra,* Transmission Planning Assessment and Regional Planning programs. If a need is identified, ERCOT recommends a project, and it is built. Any other assertion of need involves subjective policy determinations, which are better suited for the Legislature and the PUCT.

Report Title	Legal Authority	Due Date and Frequency	Recipient	Description	Is the Report Still Needed? Why?
Report on need for increased transmission and generation capacity	PURA § 39.904(k)	December 31 each even-numbered year	Legislature	PUCT and ERCOT must "study the need for increased transmission and generation capacity throughout this state and report to the legislature the results of the study and any recommendations for legislation."	This report is probably not needed. ERCOT's identification of transmission needs is based on its established system planning procedures. *See, e.g., supra,* Transmission Planning Assessment and Regional Planning programs. If a need is identified, ERCOT recommends a project, and it is built. Any other assertion of need involves subjective policy determinations, which are better suited for the Legislature and the PUCT. A filing on generation capacity needs is probably unnecessary, as well, because ERCOT already publicly posts a Capacity, Demand, and Reserves Report (CDR) each May and December that provides a detailed forecast of generation adequacy. ERCOT also posts a Seasonal Assessment of Resource Adequacy (SARA) for each upcoming season. These reports are shared with State leadership, including the PUCT, and are publicly-available on ERCOT's website.

B. Does the agency's statute use "person-first respectful language" as required by Texas Government Code, Section 325.0123?

All ERCOT policies incorporate person-first, respectful language. All ERCOT policies are reviewed annually.

C. Please describe how your agency receives and investigates complaints about the agency and its operations.

There are four primary types of processes through which ERCOT receives and investigates complaints about its operations: 1) EthicsPoint submissions; 2) settlement and billing disputes; 3) Alternative Dispute Resolution (ADR) proceedings; and 4) complaints filed with the PUCT.

EthicsPoint:

ERCOT's website includes an Ethics page that outlines ERCOT's Code of Conduct and the reporting of improper conduct by an ERCOT employee. *See* http://www.ercot.com/about/governance/ethics. This page explains that "anyone who has suspicions of fraud, theft, illegal bribes, or other violations of ERCOT's Ethics Agreement or Code of Conduct" may report such behavior using an online reporting tool called EthicsPoint, or by calling a toll-free number, both of which are administered by a third-party service provider.

ERCOT's corporate standards require all employees to report any improper conduct, and they are reminded annually about the EthicsPoint reporting process. Reporting parties may choose to remain anonymous.

ERCOT investigates all EthicsPoint complaints promptly and impartially. Upon receipt of a complaint, the ERCOT General Counsel will meet with the ERCOT Board Chair and the ERCOT Board's Finance and Audit (F&A) Committee Chair to discuss all facts pertaining to the complaint, and to determine whether a reasonable basis exists for commencing a formal investigation into the complaint. The Board and F&A Chairs may obtain assistance from ERCOT personnel and external expertise as necessary to conduct an investigation. ERCOT's General Counsel and/or the F&A Chair will provide confidential reports to the Board on the status of any ongoing investigation and will report the investigation's findings to the Board in executive session of the next scheduled ERCOT Board meeting. If the Board determines that the complaint has merit, it will proceed with taking appropriate action.

Settlement and Billing Disputes:

Section 9.14 of the ERCOT Protocols establishes the process for a Market Participant to submit a Settlement and Billing Dispute. Market Participants who receive settlement statements or invoices from ERCOT are responsible for reviewing and verifying such documents and may initiate a settlement and billing dispute to complain about ERCOT's settlement calculations. *See* ERCOT Protocols, §§ 9.14.1-9.14.3. Settlement and billing disputes must typically be filed within ten business days after receiving the settlement statement or invoice. *See id.* Market Participants submit such disputes electronically through an online form provided on ERCOT's Market Information System (MIS).

When a dispute is filed, it is received by ERCOT Client Services, who will assign a client representative to manage the dispute. The ERCOT client representative analyzes the allegations in the dispute and consults with appropriate ERCOT subject matter experts (SMEs) to make a recommendation regarding the dispute's resolution. *See* ERCOT Protocols, §§ 9.14.4-9.14.10. The proposed resolution of the dispute is reviewed internally, and must be approved by an ERCOT manager, director, or officer before a final decision is delivered to the Market Participant. The market participant who filed the dispute is notified in writing of ERCOT's decision and may elect to appeal the decision by filing an ADR proceeding.

Alternative Dispute Resolution (ADR):

Section 20 of the ERCOT Protocols establishes a process for a Market Participant to initiate an ADR proceeding with ERCOT. The ADR process applies to "any claim by a Market Participant that ERCOT has violated or misinterpreted any law, including any statute, rule, Protocol, Other Binding Document, or Agreement, where such violation or misinterpretation results in actual harm, or could result in imminent harm, to the Market Participant." *See* ERCOT Protocols, § 20.1(1). The ADR process does not restrict the right of a Market Participant to seek direct relief from the PUCT, a court, or other governmental authority concerning ERCOT's official interpretation of ERCOT Protocols or Other Binding Documents, or in cases "where actual or threatened action by ERCOT or a Market Participant could cause irreparable harm and where such harm cannot be addressed within the time permitted under the ADR process." *See* ERCOT Protocols § 20.1(1)-(3).

An ADR proceeding is initiated by filing a written request form with ERCOT's Legal Department, submitted in accordance with the deadlines set forth in the Protocols. *See* ERCOT Protocols, §§ 20.2-20.5. When an ADR request is filed, the ERCOT General Counsel designates an ERCOT Director to represent ERCOT in its communications with the Market Participant and assigns

one of the attorneys in the Legal Department to manage the ADR proceeding. The attorney examines the allegations, applicable Protocols or other law, and consults with appropriate ERCOT SMEs and the designated ERCOT Director. ERCOT then schedules an initial meeting with the Market Participant to discuss the issues in the ADR. Thereafter, ERCOT makes a final determination as to whether the relief requested in the ADR should be granted or denied. Once a final determination is made, ERCOT prepares a draft Market Notice that summarizes the allegations in the ADR and ERCOT's decision. The draft is provided to the Market Participant for review, and one week later it is published as a formal Market Notice sent out to all Market Participants. The disputing Market Participant may elect to appeal ERCOT's decision in the ADR to PUCT pursuant to PUCT Procedural Rule § 22.251.

PUCT Complaints:

PUCT Procedural Rule § 22.251 establishes a process for any entity affected by ERCOT to file a complaint with the PUCT. Section 22.251(b) describes the types of complaints that may be submitted:

> **Scope of complaints**. Any affected entity may complain to the commission in writing, setting forth any conduct that is in violation or claimed violation of any law that the commission has jurisdiction to administer, of any order or rule of the commission, or of any protocol or procedure adopted by ERCOT pursuant to any law that the commission has jurisdiction to administer. For the purpose of this section, the term "conduct" includes a decision or an act done or omitted to be done. The scope of permitted complaints includes ERCOT's performance as an independent organization under the PURA including, but not limited to, ERCOT's promulgation and enforcement of procedures relating to reliability, transmission access, customer registration, and accounting for the production and delivery of electricity among generators and other Market Participants.

If a complaint is filed with the PUCT under this rule, ERCOT's General Counsel receives a copy of the complaint and assigns an attorney to represent ERCOT in the proceeding. ERCOT designates knowledgeable SMEs to assist in evaluating the underlying issues and assisting with ERCOT's response. The complaint becomes a contested case before the PUCT and is subject to the timelines and procedures described in § 22.251(d)-(o). If the PUCT finds merit in the complaint, it may issue an order instructing ERCOT to take corrective action and granting other relief the PUCT may deem appropriate. *See* 16 Texas Admin. Code § 22.251(o). If either party is dissatisfied with the PUCT's decision, they may file an appeal in district court.

Complaints Against ERCOT — Fiscal Years 2019 and 2020

	Fiscal Year 2019	Fiscal Year 2020
Number of complaints received (EthicsPoint)	3	9
Number of complaints resolved (EthicsPoint)	3	9
Number of complaints dropped / found to be without merit (EthicsPoint)	3	3
Number of complaints received (ADR)	4	4
Number of complaints resolved (ADR)	4	4

	Fiscal Year 2019	Fiscal Year 2020
Number of complaints dropped / found to be without merit (ADR)	3	4
Number of complaints received (PUCT)	1	3
Number of complaints resolved (PUCT)	1	3
Number of complaints dropped / found to be without merit (PUCT)	0	0
Number of complaints pending from prior years	0	0
Average time period for resolution of a complaint	30 days	30 days

D. Fill in the following charts detailing your agency's Historically Underutilized Business (HUB) purchases.

ERCOT HUB & Diversity Spend

Fiscal Year 2018

Category	HUB Spend	Diversity Spend
Custodial Services	$229,665.66	--
Equipment Maintenance	$2,954.95	--
Equipment and Tools	$7,760.00	--
Professional Services	$202,424.12	--
Furniture and Equipment	$35,485.84	--
Consulting Services	$98,325.00	--
IT Hardware and Software	$677,822.27	--
Furniture and Equipment	$242,281.66	--
Contingent Labor Services	--	$5,245,500.00
TOTALS	$1,460,719.50	$5,245,500.00
Total HUB / Diverse 2018 Spend: $6,706,219.50 **Total ERCOT 2018 PO Spend:** $82,499,190.83 **% HUB / Diverse of 2018 Overall Spend:** 8.13%		

Fiscal Year 2019

Category	HUB Spend	Diversity Spend
Custodial Services	$250,307.12	--
Professional Services	$324,175.51	--
Furniture and Equipment	$233,392.79	--
Consulting Services	$15,380.00	--
IT Hardware and Software	$810,313.37	--
Audit Services	$12,000.00	--

Category	HUB Spend	Diversity Spend
Buildings & Improvements	$12,931.85	-
Contingent Labor Services	--	$2,227,858.00
TOTALS	$1,658,500.64	$2,227,858.00*
Total HUB / Diverse 2019 Spend: $3,886,358.64 **Total ERCOT 2019 PO Spend:** $74,053,683.18 **% HUB / Diverse of 2019 Overall Spend:** 5.25% ** Due to a transition in ERCOT's Contingent Workforce Management program, 2019 represents tracked diversity spend for Jan.-June only. Overall diversity spend is estimated to be $4.5 million.*		

Fiscal Year 2020

Category	HUB Spend	Diversity Spend
Professional Services	$317,554.25	--
Furniture and Equipment	$108,000.15	--
IT Hardware and Software	$943,133.46	--
Buildings & Improvements	$349,564.19	--
Contingent Labor Services	--	$4,245,500.00
TOTALS	$1,718,252.05	$4,534,030.00
Total HUB / Diverse 2020 Spend: $6,252,282.05 **Total ERCOT 2020 PO Spend:** $82,593,151.53 **% HUB / Diverse of 2020 Overall Spend:** 7.57%		

E. Does your agency have a HUB policy? How does your agency address performance shortfalls related to the policy? (Texas Government Code, Section 2161.003; TAC Title 34, Part 1, Rule 20.286c)

ERCOT is not a state agency subject to the State HUB Program requirements, and thus does not have a formal HUB policy. However, ERCOT has consistently tracked "diversity spend" for contingent labor services. Diversity spend includes businesses owned and operated by individuals or groups that are a part of a traditionally underrepresented or underserved group, such as small-business enterprises (SBEs), minority-owned business enterprises (MBEs), and woman-owned business enterprises (WBEs). These businesses are not all State-certified HUB vendors and, accordingly, for purposes of providing the data above, the HUB vendors included among ERCOT's diversity spend were manually identified through the State's CMBL/HUB Directory.

F. For agencies with contracts valued at $100,000 or more: Does your agency follow a HUB subcontracting plan to solicit bids, proposals, offers, or other applicable expressions of interest for subcontracting opportunities available for contracts of $100,000 or more? (Texas Government Code, Section 2161.252; TAC Title 34, Part 1, Rule 20.285)

Not applicable.

G. For agencies with biennial appropriations exceeding $10 million, answer the following HUB questions.

1. **Do you have a HUB coordinator? If yes, provide name and contact information. (Texas Government Code, Section 2161.062; TAC Title 34, Part 1, Rule 20.296)**

Because ERCOT is not a state agency subject to the State's HUB Program requirements, ERCOT does not have a HUB coordinator as that term is defined under Texas Government Code Section 2161.022(e). However, Jimmy Ramirez, ERCOT Director of Supply Chain Management, will serve as the point of contact for any HUB-related questions.

2. **Has your agency designed a program of HUB forums in which businesses are invited to deliver presentations that demonstrate their capability to do business with your agency? (Texas Government Code, Section 2161.066; TAC Title 34, Part 1, Rule 20.297)**

Not applicable.

3. **Has your agency developed a mentor-protégé program to foster long-term relationships between prime contractors and HUBs and to increase the ability of HUBs to contract with the state or to receive subcontracts under a state contract? (Texas Government Code, Section 2161.065; TAC Title 34, Part 1, Rule 20.298)**

Not applicable.

H. Fill in the charts below detailing your agency's Equal Employment Opportunity (EEO) statistics.

ERCOT Equal Employment Opportunity Statistics

1. Officials / Administration

Year	Total Number of Positions	Percent African-American	Statewide Civilian Workforce Percent	Percent Hispanic	Statewide Civilian Workforce Percent	Percent Female	Statewide Civilian Workforce Percent
2018	182	2.20%	8.10%	7.69%	22.40%	23.08%	38.80%
2019	184	2.72%	8.10%	7.61%	22.40%	22.28%	38.80%
2020	177	2.82%	8.10%	7.34%	22.40%	22.03%	38.80%

2. Professional

Year	Total Number of Positions	Percent African-American	Statewide Civilian Workforce Percent	Percent Hispanic	Statewide Civilian Workforce Percent	Percent Female	Statewide Civilian Workforce Percent
2018	534	3.93%	10.90%	9.55%	20.30%	31.65%	54.50%
2019	550	4.36%	10.90%	8.91%	20.30%	30.36%	54.50%
2020	572	4.55%	10.90%	9.09%	20.30%	30.42%	54.50%

3. Technical

Year	Total Number of Positions	Percent African-American	Statewide Civilian Workforce Percent	Percent Hispanic	Statewide Civilian Workforce Percent	Percent Female	Statewide Civilian Workforce Percent
2018	39	23.08%	14.40%	15.38%	29.20%	12.82%	55.20%
2019	35	20.00%	14.40%	22.86%	29.20%	5.71%	55.20%
2020	37	18.92%	14.40%	21.62%	29.20%	2.70%	55.20%

4. Administrative Support

Year	Total Number of Positions	Percent African-American	Statewide Civilian Workforce Percent	Percent Hispanic	Statewide Civilian Workforce Percent	Percent Female	Statewide Civilian Workforce Percent
2018	49	4.08%	14.30%	10.20%	36.40%	53.06%	71.60%
2019	32	3.13%	14.30%	6.25%	36.40%	62.50%	71.60%
2020	25	0.00%	14.30%	4.00%	36.40%	68.00%	71.60%

I. Does your agency have an equal employment opportunity policy? How does your agency address performance shortfalls related to the policy?

ERCOT has an equal employment opportunity policy, which provides in relevant part:

5.1.1 Nondiscrimination: ERCOT (herein referred to as the "Company") is firmly committed to equal employment for all qualified persons without regard to race, color, gender or gender identity or expression, medical condition, religion, age, creed, national origin, citizenship status, marital status, sexual orientation, physical or mental disability, ancestry, veteran status, genetic information, or any other protected category under federal, state or local law. This commitment shall not be interpreted to require the Company to act in a manner that would result in:

- Reduction in quality or efficiency of ERCOT's operations.
- Employment, promotion or transfer into a job of any person who is not able to perform the essential functions of such job at the time of employment or promotion, with reasonable accommodation for disability.
- Discharge, layoff, demotion or transfer of anyone for the accomplishment of a balanced workforce.
- Selection of anyone other than a qualified and available person.

See ERCOT Policy CS5.1, Human Resources and Employee Classification Corporate Standard, attached hereto.

ERCOT seeks to hire the best-qualified candidate for the job. To that end, ERCOT's Workforce Corporate Policy emphasizes that all employment applicants will be considered on the basis of their individual qualifications. *See* ERCOT Policy CP5, attached hereto. To further its commitment to providing employment and advancement opportunities based on qualifications

and merit, ERCOT has also put in place rules on nepotism. *See* CS5.16, attached hereto. An equal employment opportunity statement is additionally provided on the internal Employee Toolbox page, to which all ERCOT staff has access.

Any concerns and/or complaints regarding ERCOT's equal opportunity employment policies may be brought forth for investigation through notification to ERCOT's Human Resources or Legal Departments, or through EthicsPoint, a confidential internal reporting tool.

XII. Agency Comments

ERCOT IT Division.

While not a "program" per se, information technology is critical to the mission of ERCOT. The ERCOT Information Technology Division (IT) is structured to manage, plan, operate, and support the critical cyber and system infrastructure assets necessary to:

- manage the reliability of the Texas electric grid;
- facilitate Day-Ahead and Real-Time Wholesale Electric Market;
- provide open access to the energy market;
- support settlement and billings for the market;
- enable retail customer choice; and
- provide open market information for all participants.

Additionally, IT plays a vital role to ERCOT's day-to-day internal operations, such as payroll, accounting and procurement systems, legal, human resources, desktop support, voice and virtual meeting systems, email, and intranet systems as well as internet access.

The ERCOT systems are required to be available 24/7 and operate in a fault tolerant manner. To facilitate this, IT has a redundant architecture that is deployed in data centers hosted at two geographically separated sites that are each capable of operating independently. IT also supports a third site that is used for corporate purposes or stakeholder meetings.

IT also provides solutions to the business team by gathering requirements provided by the business team and working with multiple vendors to find solutions that are customized to the needs of ERCOT. IT is also responsible for the maintenance and patching of these systems and maintains required regulatory compliance.

ERCOT IT is composed of nine key services. A brief description of those services is included below:

- **Grid Management Services** – This service provides systems and support for the Grid Operations, Planning Transmission, Resources and Operations programs.
- **Wholesale Market Management Services** – This service provides IT systems and support for the Wholesale Market Management programs.
- **Retail Market Management Services** – This service provides IT systems and support for the Retail Market Management programs.
- **Market Data Transparency** – This service provides IT systems and support for the various reports that are made available to the public, PUCT, and Market Participants. It also supports the corporate communication to the Market Participants via the Market Information Systems as well as the ercot.com web pages.

- **ERCOT Corporate Applications** – This service provides IT systems and support for the email, payroll, finance, accounting, human resources, legal, procurement, service management, and other services for the day-to-day running of the ERCOT organization.

- **IT Infrastructure Management** – This service provides IT systems and support for the IT network, telecommunication infrastructure, monitoring services, backup services, and internet services.

- **Security** – This service provides IT systems and support for the Cybersecurity program.

- **IT Governance** – This service provides IT systems and support for User Access management and authorization to various systems in various environments at ERCOT. It also provides services to manage software, hardware, or configuration changes to any system.

- **IT Remote access and Help services** – This service provides IT systems and support for remote access to the ERCOT systems, helpdesk, desktop services including managing computers issued to employees, etc.

The following table gives a view of the current IT investments and maintenance expenses distribution among the various business services supported by IT. The majority of the IT investment and expenditure is around the core business services for Grid Reliability, Market Operations, and Data Transparency.

Services	FTE	IT Infrastructure	Hardware and Software Maintenance *(based on 2020 actuals)*
Grid Management Services	15%	19%	15%
Wholesale Market Management Services	12%	22%	24%
Retail Market Management Services	7%	8%	6%
Market Data Transparency	14%	25%	17%
ERCOT Corporate Applications	12%	2%	10%
IT Infrastructure Management	24%	11%	15%
Security	0%*	3%	5%
IT Governance	9%	7%	6%
IT Remote access and Help Services	7%	3%	2%

*Please note that, as outlined in the "Programs" section above, Cybersecurity is a separate program outside of IT.

ATTACHMENTS

The following documents have been provided, as requested, for the Sunset Advisory Commission's Self-Evaluation Report. Each requested document is labeled with its corresponding Attachment number as noted in the Self-Evaluation Report instructions.

Attachments Related to Key Functions, Powers, and Duties

1. ERCOT's Enabling Statute
   - Public Utility Regulatory Act (PURA) Section 39.151
2. Annual Reports published by ERCOT for Fiscal Years 2018 – 2020
   - ERCOT annual State of the Grid reports for years 2018 - 2020
3. Internal Newsletters (E-Wires) published by ERCOT in 2020
4. A list of studies that ERCOT is required to do by legislation or riders
5. A list of legislative or interagency studies relating to ERCOT that are currently being performed.
6. A list of studies from other states, the federal government, or national groups and/or associations that relate to or affect ERCOT or agencies with similar duties or functions
7. A list describing the type of personal information of license holders the agency publishes on its website. Please also explain if and how license holders can opt out of this publication. **This item is not applicable to ERCOT.**

Attachments Related to Policymaking Structure

8. Biographical Information of all current ERCOT Executives and Board members.
9. Board training manuals and copies of any policies related to the board's duties and responsibilities.
   - ERCOT Amended and Restated Bylaws
   - Board Policies & Procedures
   - Board Member Orientation
   - Committee Education on ERCOT Membership
   - Unaffiliated Director Training Modules

10. Employee manuals and copies of any policies related to staff's duties and responsibilities.

11. Significant policies adopted by the Board during Fiscal Years 2018 - 2020.
    - Board and Employee Ethics Agreements
    - Financial Corporate Standard
    - Investment Corporate Standard
    - Market Risk Corporate Standard
    - ERCOT's Protocols, which were amended during this time, may be found here

Attachments Related to Funding

12. A copy of the agency's Legislative Appropriations Requests for Fiscal Years 2022 - 2023. **This item is not applicable to ERCOT**.

13. ERCOT's Annual Financial Reports from Fiscal Years 2018 - 2020

14. ERCOT's Operating Budget from Fiscal Years 2018 - 2020

15. A list of all contracts above $1 million

Attachments Related to Organization

16. Maps that illustrate the regional boundaries and headquarters locations of ERCOT

17. Flowcharts showing the operations of ERCOT.
    - Texas Standard Electronic Transactions
    - ERCOT Settlement Processes and Timelines
    - Wholesale Market Overview
    - Retail Market Overview
    - Overview of Wholesale Market Costs and Cost Management
    - Market Governance Structure
    - Market Participant Invoice and Settlement Statement Dispute Process

18. A list of all active ERCOT information sharing agreements.

Attachments Related to ERCOT's Organization

19. Quarterly Performance Reports for Fiscal Years 2019 – 2020
    - 2019 and 2020 Key Performance Indicator Reports

20. Performance reports presented to the Board in Fiscal Years 2018 – 2020.
    - 2020 Financial Summary
    - 2020 Human Resources Summary
    - 2018 – 2020 Monthly Operational Overviews
    - 2018 – 2020 CEO Updates

21. Performance reports submitted to the Legislative Budget Board from Fiscal Years 2018 – 2020. **This item is not applicable to ERCOT.**

22. Any recent studies on ERCOT or any of its functions conducted by outside management consultants or academic institutions.
    - Estimation of the Market Equilibrium and Economically Optimal Reserve Margins for the ERCOT Region (The Brattle Group, 2018)
    - The Brattle Group - Estimation of the Market Equilibrium and Economically Optimal Reserve Margins for the ERCOT Region (Astrapé Consulting, 2021)
    - Regional Wind Power Ramp Forecasting through Multinomial Logistic Regression (Texas Tech, 2020)
    - The Timeline and Events of the February 2021 Texas Electric Grid Blackouts (UT Austin, 2021)

23. ERCOT's current Internal Audit Plan

24. ERCOT's current Strategic Plan

25. A list of ERCOT's Internal Audit Reports from Fiscal Years 2016 – 2020

26. A list of State Auditor Reports from Fiscal Years 2005 – 2009 that relate to the agency or any of its functions. **This item is not applicable to ERCOT**.

27. Any customer service surveys conducted by or for ERCOT in Fiscal Years 2019-2020.
    - 2019 and 2020 voluntary Market Participant surveys promulgated by the Client Services program. ERCOT did not conduct a comprehensive Market Participant survey during this time.

28. Any reports created under Texas Government Code, Section 2110.007 regarding the usefulness and costs of the agency's advisory committees. **This item is not applicable to ERCOT.**

29. A description of the agency's review of existing rules as required by Texas Government Code, Section 2001.039, and for the last eight years, a brief description of the rules reviewed by date and the result the review. **This item is not applicable to ERCOT.**

Other Requested Items

30. ERCOT Organizational Chart

31. Description of ERCOT Temporary Contract Workers for Fiscal Year 2020.